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vations, and are probably the most accurate predicted star-positions in existence. They have been made the standard in the Memoir now laid before the Academy.

Professor Peirce made the following brief communication, —

On the Lunar Bolis.

In a memoir by the illustrious Plana "on the motion of the centre of gravity of a solid body, thrown towards the earth, between the centres of the moon and the earth, which are supposed fixed in space directly after the impulse," the attention of geometers is drawn to the hypothesis of the lunar origin of the bolis. This memoir deserves to be studied for its interesting mathematical developments. But the limitations of the problem, arising from the immobility of the moon and earth, remove the solution quite far from the case of nature. And yet it would seem that, in its unlimited form, the problem was beyond the powers of analysis. This is indeed the case, theoretically; but practically, the solution is greatly simplified by giving the moon its proper motion relatively to the earth.

The reason of this practical simplification is not difficult to perceive. The path of the bolis which actually comes from the moon to the earth must differ very little from a straight line; and it is only in the immediate vicinity of the moon that there can be any sensible motion perpendicular to the radius vector drawn to the earth. When the bolis leaves the sphere of the lunar action, then its velocity must be almost wholly in the direction of the radius vector drawn to the earth. A careful and critical analysis fully confirms this inference, which was indeed the basis of Dr. Gould's memoir upon the lunar origin of the aerolites, which was read at the Springfield Meeting of the American Association for the Advancement of Science, and establishes the conclusions of that original and able memoir.

Five hundred and thirteenth meeting.

October 14, 1862. — MONTHLY MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary presented the following botanical papers: —

1. *Characters of some New or Obscure Species of Plants, of Monopetalous Orders, in the Collection of the United States South Pacific Exploring Expedition under Captain Charles Wilkes, U. S. N. With various Notes and Remarks.* By ASA GRAY. (Continued from Vol. V. p. 352, November, 1861.)*

Cyrtandræ Polynesienses.

SINCE the publication of the diagnoses of the *Cyrtandræ* of the Sandwich Islands, specimens collected in our Expedition at the Society and Samoan or Navigators' Islands, accidentally mislaid, have come to light. *C. biflora*, the original of the genus, is the only one recorded from the Society Islands. But we have now tolerable materials of two other Tahitan species, as well as four or five from the Samoan or Navigators' Islands.

CYRTANDRA BIFLORA (Forst.): arborea, pube furfuracea crocea nascentium partium mox delapsa glaberrima; foliis (3-5-pollicaribus) ovato- seu lanceolato-oblongis utrinque subacutis lævibus subtus palli-

* *Cyathodes Douglasii*, of the preceding paper, p. 325, proves to be *C. imbricata*, Stschelglew, in Bull. Soc. Mosc. 32, p. 10, a memoir published in the year 1859, which I had overlooked.

Nama. The following is supplementary to the revision of this genus published in the preceding paper, p. 337:—

Specimens of two new species of *Nama*, collected somewhere in the interior of California, probably in the southern part of the country, by Mr. Lobb, have been communicated to me from the Hookerian herbarium. They do not fall well into place under any of the divisions in my revision; but one of them might stand next to *N. organifolia*, although it has the inflorescence of *N. sericea*; the other should be placed between *N. hispida* and *N. sericea*, having the white villosity of the latter and the slender sepals of the former. The distinctive characters are annexed.

NAMA LOBBII (sp. nov.): albo-pilosa; caule basi suffruticuloso; foliis anguste spathulatis basi longe attenuatis vix petiolatis subtus pilis arachnoideis albo-villosis; floribus subsessilibus congestis; sepalis angustissime linearibus sursum attenuatis corollæ tubum (limbo paullo longius) subæquantibus; ovario stylisque hirsutis. Corolla 5 lin. longa. — California, Lobb, No. 108.

NAMA STYSTYLA (sp. nov.): viscoso-hirsutula; caule debili; foliis ovatis petiolatis; pedunculis gracilibus cymoso-plurifloris; sepalis angustissime linearibus superne haud dilatatis hispidis corolla triplo brevioribus; stylis longe ultra medium connatis inferne cum ovario hispidis. Corolla semipollicaris, angusta. — California, Lobb, No. 164. The connate styles, united for more than two thirds their length, are peculiar to this species.

dis crenato-sub serratis vel subintegerrimis; pedunculis petiolum paullo excedentibus "involucrum albidum 2-3-phyllum caducum pedicellosque 2-3, unifloros gerentibus"; calycis quinquefidi lobis lato-lanceolatis sensim acuminatis; corolla bipollicari; fructu oblongo. Folia adulta in sicco chartacea, venis paginæ inferioris albidæ perspicuis at vix prominulis.—Tahiti. Also, Tutuila, of the Samoan Islands, unless there has been transposition of specimens. Our specimens are very incomplete, wanting the corolla, calyx, &c. The above character is completed partly from Forster's figures, and his detailed description printed in Guillemin's *Zephyritis Taitensis*, and partly from notes upon his specimen in the herbarium of the British Museum. Hooker and Arnott, in *Bot. Beech. Voy.*, having introduced the phrase "calyce pubescenti-tomentoso" into the character, must have had one of the following Tahitian species in view, and so probably had De Candolle. The nearest relative of *C. biflora* is the following, from the Samoan Islands.

CYRTANDRA PULCHELLA (Rich in herb. Expl. Exped., sp. nov.): "fruticosa, tripedalis," glaberrima; foliis oblongo-lanceolatis (5-9-pollicaribus) subfalcatis basi subcuneata inæquilatera versus apicem repando-crenatis supra nitidis subtus pallidis; pedunculis folio paullo brevioribus 7-9-floris; "bracteis latis" caducis; calycis coriacei breviter inæqualiter quinquefidi lobis ovatis obtusis; corolla bipollicari; ovario elongato.—Tutuila, one of the Samoan Islands, on the mountain ridge. Peduncles 4 or 5 inches long up to the bifurcation, stout, inclined to become fistulous. Anthers, as in all the following species which have an elongated and dry berry, with the cells perfectly parallel, and the stigma is 2-lobed; so that they are truly of this genus.

CYRTANDRA INDUTA (sp. nov.): arborescens, foliis inæqualibus (altero 5-8-, altero 8-14-pollicari) ovatis seu ovali-oblongis acuminatis dentatis basi inæquilatera sæpius acutis pilis pluriseptatis supra hirsutis subtus cum petiolis pedunculis ramisque junioribus molliter villosis; pedunculis petiolo æquilongis plurifloris; calyce infundibuliformi pubescente, lobis lanceolatis acuminatis tubo 2-3-plo brevioribus; corolla bipollicari; fructu immaturo elongato-oblongo basi attenuato quasi stipitato.—Tahiti, in the mountains, at the elevation of 2000 to 3000 feet, collected by Professor Dana. I have a less downy specimen, communicated by M. Pancher, said to be very common in moist valleys of Tahiti, the pubescence of the lower surface of the leaves ferruginous. This has been confounded with *C. biflora*, but it is wholly

distinct. Calyx nearly an inch and a half long when full grown, acute at the base. The forming fruit an inch and a half long, including the attenuate base.

CYRTANDRA TAITENSIS (Rich in herb. Expl. Exped., sp. nov.): fruticosa, "8-10-pedalis," puberula vel glabella, partibus novellis pube minuta sericea subferrugineis; foliis fere æqualibus ovatis seu ovato-oblongis acutis vel acuminatis subserratis (6-12-pollicaribus), adultis supra hirtulo-scabridis subtus ad costas prominulas venulasque puberulis; pedunculis petiolo 3-4-plo longioribus plurifloris; calyce campanulato brevi ad medium quinquefido, lobis ovato-acuminatis; corolla sesquipollicari, tubo gracili; fructu immaturo elongato-oblongo haud basi attenuato.—Tahiti, in the forest. One specimen is ticketed "Samoa," but as one specimen of the following species is ticketed "Tahiti," a transposition of the loose tickets may be strongly suspected. Petioles slender, 12 to 18 lines long. Peduncles often thickish, and inclined to be fistulous, 3 to 6 inches long. Cyme apparently loose and rather many-flowered, three or four times dichotomous, with a flower in each fork. Corolla white; the tube narrower and the limb smaller than in the foregoing species.

CYRTANDRA SAMŌENSIS (sp. nov.): frutescens, novellis partibus minutim ferrugineo-vel fulvo-pubescentibus; foliis ovatis ovalibusque (6-12-pollicaribus) æqualibus utrinque sæpius acutis vel subacuminatis subdentatis vel fere integerrimis, adultis supra glabratis subtus albidis ad costas prominulas venulasque pubescentibus, petiolo (sesqui-quadrupollicari) cymis plurifloris breve-pedunculatis bis terve longioribus; calyce tenuiter pubescente a basi 5-(-6-) partito, segmentis lato-lanceolatis corolla semipollicari paullo brevioribus; fructu breviter ovoideo.—Tutuila, Savaii, and Manua, Samoan Islands, along the coast. A specimen is ticketed "Tahiti," probably through a transposition. This should be compared with *C. latifolia*, Benth., a Feejean species not yet met with in later collections, which, however, has peduncles 2 or 3 inches, and the petiole only an inch long. In the present species, the peduncle is half an inch, or at most an inch long, the corymbose or umbel-like cyme about the same length. Forster's *C. cymosa*, from Tanna, as described by Vahl, also has peduncles surpassing the petiole.

CYRTANDRA RICHII (sp. nov.): glabra; caule fruticoso crasso (10-15-pedali); foliis amplis (1-2-pedalibus) membranaceis lanceolato-oblongis basi attenuatis subintegerrimis utrinque viridibus; cymis sub-

sessilibus fasciculiformibus petiolo brevioribus; "corolla viridula suburceolata parvula"; fructu immaturo ovoideo. — Savaii, one of the Samoan Islands, in the deep, interior forest. Petioles 3 or 4 inches long, stout. Calyx and also the corolla not seen by me.

CYRTANDRA LABIOSA (sp. nov.): glabra, præcedenti affinis, sed foliis lato-lanceolatis multo minoribus (6–7-pollicaribus); "floribus majoribus; corolla alba eximie bilabiata." — Savaii, Samoan Islands. Loose corollas with the very imperfect specimens appear to be short and broad, deeply bilabiate, the lips twice or thrice the length of the tube, the upper one arching, the lower spreading.

CYRTANDRA POGONANTHA (sp. nov.): frutescens; foliis amplis (pedalibus) utrinque acutis vel basi attenuatis subintegerrimis glabratissimis viridibus membranaceis, nascentibus ferrugineo-pubescentibus; cymis petiolo brevioribus involucreis brevi-pedunculatis hirsutis; alabastris (calycis) rostrato-acuminatis; corolla tubulosa breviter bilabiata (lobis conformibus ovatis subacutis) extus pilis longis pluriseptatis insigniter barbata. — Savaii, Samoan Islands, in the deep, interior forest. The calyx in anthesis apparently splits down one side to near the middle. Corolla an inch long; the bearded whitish hairs which cover the outer surface, especially of the limb, are remarkable. In structure they resemble those of the petioles and branches of the two following species. Stamens 2, as of the genus; anthers exerted from the throat. Fruit not seen.

The following are the Feejean species of our collection.

CYRTANDRA MILNEI (Seem. in Bonplandia, 9, p. 257, absq. char.): caule crasso; ramis petiolis costaque foliorum rufo-villosissimis, pilis longis multiseptatis superne attenuatis; foliis (5–8-pollicaribus) ovalibus utrinque acutis vel acuminatis serratis pilosis; pedunculis brevissimis plurifloris; bracteis amplis; calyce pedicello longiori tubuloso fere æqualiter 5-dentato persistente fructus ovatum includente. — Feejee Islands. This remarkable species we have in fruit only; the corolla and stamens therefore unknown to me. The very shaggy petioles 3 or 4 inches long; the blade of the leaf conspicuously veiny. Fructiferous calyx 7 to 10 lines long, cylindraceous or tubular-cyathiform, glabrate, longer than the included even full-grown fruit.

CYRTANDRA DOLICHOCARPA (sp. nov.): frutescens; ramis gracilibus, junioribus cum petiolis pedunculisque (unifloris?) pilis longis rufescentibus multiseptatis (modo *C. Milnei*) barbatis; foliis subæqualibus lanceolato-oblongis acuminatis denticulatis supra hispidulis subtus

breviter fulvo-pubescentibus; calyce longe tubuloso fructu cylindrico siliquæformi ($1\frac{1}{2}$ –2-pollicari) acuto $\frac{1}{3}$ brevior sero deciduo. — Sandalwood or Mbua Bay, Vanua-levu, Feejee Islands. A solitary specimen, in fruit only. Evidently allied to *C. Milnei*, by the pubescence, tubular calyx, &c. The latter is made out from vestiges which remain upon one side of one of the fruits, showing that it attains fully an inch in length. Yet it is exceeded by the singularly elongated fruit, which, except in form, resembles that of other species of *Cyrtandra*, i. e. is corticate, probably fleshy when fresh, but juiceless, and indehiscent. The stamens must determine whether its relationship is with *Fieldia* or *Whitia* (the latter probably no good genus); but other Polynesian species exhibit a similar, only less elongated fruit.

CYRTANDRA INVOLUCRATA, Seem. l. c. A very imperfect specimen, from Ovolau, appears to belong to this species (the involucre fallen); but my specimen from Dr. Seemann wants the flowers, that of the Expedition the fruit, and both the corolla, — so that I cannot properly identify them nor furnish a specific character. In ours, the calyx is rostrately acuminate in the bud, the lobes subulate from a broad base and about the length of the ovoid-campanulate tube.

CYRTANDRA ANTHROPOPHAGORUM (Seem. l. c.): frutescens, minutim fusco-pubescent; foliis oblongis acuminatis subserratis (3–5-poll.); pedunculis petiolo brevioribus paucifloris, pedicellis flore longioribus; calyce ad medium 5-fido, lobis subulato-lanceolatis corolla (semipollicari) dimidio brevioribus; fructu ovato-oblongo. — Ovolau. The flower is described from scanty materials in the collection of the Expedition, the young fruit from that of Dr. Seemann.

CYRTANDRA PRITCHARDI, Seem. l. c. Ovolau. Dr. Seemann's materials are probably much better than ours.

The Feejee Islands are apparently as rich as the Sandwich Islands in species of *Cyrtandra*. Besides those above mentioned, Dr. Seemann has the following undescribed ones, which are not in the Exploring Expedition's collection: *C. acutangula*, with square branches; *C. Vitiensis*, with a tubular calyx; *C. coleoides*, and *C. ciliata*. None of these wholly accords with one collected by Prof. Harvey, nor with the characters of Bentham's *C. calycina* and *C. latifolia*. The former must, by its calyx, be of the same group with *C. Vitiensis*, *C. Milnei*, &c.

Gentianaceæ.

ERYTHRÆA SABÆOIDES. *Schenkia sabæoides*, Griseb. in Bonplandia, 1, p. 226. This plant was not met with by the naturalists of

Wilkes's Expedition. But having examined a specimen of Seemann's no. 2272, and of Remy's no. 375, from Oahu, I cannot regard the plant as other than a close congener of the plant which it most resembles, viz. *Erythræa spicata*. The leaves are broader and rounder, being broadly oval, the tube of the corolla proportionally shorter and its lobes broader; the sepals are less narrow and more carinate, or, if you please, winged on the back. But this varies somewhat, even in the sepals of the same flower, and at most is only a matter of degree, the sepals being carinate, at the base sharply so, in *E. spicata*. So other American species effect a transition in this respect to *Gyrandra*, Griseb. (*Erythræa chironioides*, Torr.). Grisebach describes the stigma of his *Schenkia* as "capitulatum," or "crassiusculum"; but there must be some mistake or confusion here. For in Seemann's own specimens, which I have examined, as also in those of Remy, the stigma is very large and just as in *E. spicata*, that is, appearing as this organ is characterized by Grisebach in the section *Spicaria*, but upon maturation separating completely into two nearly orbicular flat divisions.

In *Erythræa* generally I cannot verify the character "corolla supra capsulam contorto-marcescens."

LIMNANTHEMUM KLEINIANUM, Griseb. var.? Imperfect specimens of a *Limnanthemum* from the Feejee Islands, said to be "common in Taro ponds, and probably introduced," (and similar ones were collected there by Dr. Harvey,) accord, except in their smaller leaves, with Dr. Seemann's 323, referred by him to *L. Kleinianum*. But they differ from my only Indian specimen of the latter (from Maisor or the Carnatic, coll. Thomson and Hooker) in not having three ribs prominent underneath, in their smaller flowers (the corolla in all too poor for investigation), and in their flat and acute-edged, perfectly smooth seeds. Those of the Indian specimen referred to are not badly represented in Hook. Bot. Misc. 3, suppl. t. 30, in the figures which Grisebach excludes from the species, being turgid, obtuse at the margin, and their face minutely muricate by fine spiculæ, which, however, may be readily rubbed off.

Solanaceæ.

SOLANUM NELSONI (Dunal in DC. Prodr. 13, p. 123?): inerme, pube stellata fulvo- seu flavido-tomentosum; caulibus fruticosis procumbentibus; foliis cordatis vel rotundo-subcordatis integerrimis utrinque molliter tomentosis sæpius cum axillari parvo; racemo paucifloro

pedunculato demum laterali; floribus extus tomentosis; calycis lobis ovatis obtusis corolla 5-fida plicata triplo breviori; antheris apice attenuatis incurvis filamentis (in sicco bullato-rugoso) subduplo longioribus. *Solanum argenteum*, Hook. and Arn. Bot. Beech.? *S. rotundifolium*, Nutt. in herb. Hook. — Sandwich Islands, on the sands of the low isthmus of Maui. Collected by Nuttall on Kauai, and on Oahu by Remy, no. 442. Without having seen Nelson's specimen in the Banksian herbarium, upon which Dunal, in the year 1819, drew up his character of *S. Nelsoni*, we may presume, notwithstanding some discrepancies, that it is the species here described from ampler materials. But it does not belong to his division *Pachystemonum*. The anthers, although rather short, are strongly attenuate at the summit, and the cells open by a minute and strictly apical pore. Branches perhaps sarmentose. Leaves an inch or two in length and breadth.

SOLANUM SANDWICENSE (Hook. & Arn.): fruticosum, inerme; foliis sublonge petiolatis ovatis (basi obtusa vel rotundata) integerrimis undulatis vel angulato-sinuatis supra pube stellata minuta parce delapsa glabratis subtus ramis floribusque cano- seu ochraceo-tomentosis; cymis pedunculatis plurifloris demum lateralibus, pedicellis gracilibus; calycis lobis subulatis corolla fere 5-partita (segmentis æstivatione valde induplicatis, evolutis ovalibus obtusis) 3-4-plo brevioribus; antheris oblongis arcuatis apice subattenuatis, poris apicalibus. Ludit indumento tenuiore minus incano, et in var.? β . crassiore furfuraceo. *S. Sandwicense* & *S. Woahense*, Dunal in DC. — Oahu, Sandwich Islands.

Var.? β . **KAVAIENSE**: foliis ovato-oblongis magis acuminatis, tomento furfuraceo; calycis lobis angustissimis. — Kauai, on the leeward verge of its tabular summit.

SOLANUM INCOMPLETUM (Dunal, l. c.): frutescens, subtomentosum, aculeis igneis validis (aut perpaucis aut numerosis, præcipue foliaribus rarissime caulinis) armatum; foliis longe petiolatis ovalibus oblongisve sinuatis vel subpinnatifidis (lobis brevibus obtusissimis) supra stellulato-puberulis subtus cum inflorescentia fulvo- seu ochraceo-tomentosis; pedunculis lateralibus brevissimis plurifloris; calycis lobis brevibus obtusis; corolla profunde 5-fida (alba?), segmentis oblongis arcuatis sursum vix attenuatis, poris apicalibus majusculis; baccis globosis parvis. Hawaii, Sandwich Islands, Nelson (without flowers or fruit), Remy (no. 451, a very aculeate state, in blossom), and fruiting specimens in the collection of the Expedition. Apparently only a foot or so in height, and barely woody at the base. Leaves $1\frac{1}{2}$ to 2 inches long,

and the petiole 6 to 14 lines in length. Berries half an inch or less in diameter.

SOLANUM VIRIDE, Solander, from various South Sea Islands, apparently includes *S. anthropophagorum*, Seemann, from the Feejees.

SOLANUM INAMGENUM, Benth., of the Feejee Islands, does not present tortuous branches; the leaves are seldom oblique; and cymes are often bifid.

SOLANUM AMICORUM, Benth., from Tongatabu. In the same group of islands, Dr. Harvey collected fine specimens; the globular fruit resembling that of the preceding species.

SOLANUM REPANDUM, Forst. The "Feejee Tomato" appears to be a variety of this species, altered by cultivation, the ovary nearly glabrous, the fruit completely so, and "as large as an apple."*

LYCIUM SANDWICENSE (sp. nov.): glabrum; ramis rigidis; foliis subcarnosis aveniis spathulatis obtusissimis basi attenuatis vix petiolatis plerisque fasciculatis; pedicellis solitariis folio brevioribus; floribus tetrameris; calycis breviter quadrifidi lobis late triangularibus corollæ tubum adæquantibus; corollæ lobis tubo suo longioribus patentissimis; filamentis basi glaberrimis; bacca globosa. — Sandwich Islands, on Diamond Hill, Oahu, near Honolulu. Dr. Pickering, whose judgment in this regard is critical, records it as undoubtedly indigenous; and it does not accord with any one of Mr. Miers's sixty-nine described

* The following is a North American species, which occurs in several collections: —

SOLANUM TORREYI (sp. nov.): perenne, aculeis rectis breviusculis parce armatum vel subinermis, griseo-pubescentibus pube stellata scabrida; foliis sinuato-pinnatifidis basi truncata vel subcordata, lobis 3–7, terminali undulato vel repando, costa pl. m. aculeato; cyma terminali demum laterali bifida; pedicellis defloratis recurvis; calycis tubo brevi-campanulato, lobis e basi lata caudato-acuminatis; corolla ampla ($1\frac{1}{2}$ –2 pollices lata) semiquinquefida violacea; antheris conformibus flavis elongatis apice attenuatis stylo apice incurvo brevioribus; bacca globosa (pollicem lata viridi demum lutea) calyce tum denique 5-partito subtensa. — *Solanum mammosum*? Engelm. & Gray, Pl. Lindh. 1, p. 46, no. 281, non Linn. *S. platyphyllum*? Torr. in Ann. Lyc. N. Y. 2, p. 227, non Dunal. *S.* —, Torr. & Gray in Pope, Rep. Pacif. R. R. Surv. 2, p. (172) 16. This species is not rare from the Upper Arkansas to Lower Texas. At New Braunfels, according to Lindheimer, it is common in clayey soil, wherever the original vegetation has been destroyed by men or cattle. It has long survived in the Cambridge Botanic Garden, where it spreads by running subterranean shoots, and the large flowers are rather showy. Having for many years vainly endeavored to identify the plant with some described species, I at length venture to publish it as new.

species. It occurs in no other collection that I know of, yet it was found in a district which has often been botanized over. The peculiarities of the species are its fleshy leaves, and tetramerous flowers, with the corolla so deeply cleft that it falls into Miers's section *Macrocope*. Otherwise it approaches *L. vulgare*, but it is without hairiness at the base of the filaments. Berry "saline to the taste, but edible."

The North American species, represented in Dr. Torrey's herbarium and my own, on examination, give the subjoined results.*

* *LYCIA AMERICÆ BOREALIS.*

§ 1. Flores majores: corolla infundibuliformi-tubulosa, ultra-semipollicaris (9-10 lin. longa, viridula): calyx laxè campanulatus, usque vel ultra medium 5-fidus, lobis subfoliaceis patentibus; antheræ mucrone deciduo superatæ. Glabra.

1. *L. PALIDUM*, Miers, Monogr. in Contrib. 2, p. 108, t. 67, C.; Torr. in Bot. Mex. Bound. p. 154. — New Mexico and adjacent parts of Arizona, Fendler (670, 668^b), Bigelow, Thurber, Fremont, Newberry.

Forma α : filamentis et corolla intus glaberrimis. Spec. Fendler, Newberry, &c.

Forma β : filamentis tuboque corollæ intus pilosulis (spec. Thurber) vel hirsutis (spec. Fremont e Rio Virgen).

This difference in respect to the smoothness or hairiness of the filaments and base of the corolla inside, in what is evidently the same species, throws doubt upon the value of that character in the rest of the genus. No other evidence of dimorphism is observable. Mr. Miers described the species from the smooth form; yet he noticed (what I have not detected in Fendler's specimens) some hairs below the insertion of the filaments. The lobes of the calyx ($1\frac{1}{2}$ to 2 lines long) are seldom "lineari-acutis"; they vary from lanceolate to ovate, and are often very obtuse.

§ 2. Flores mediocres sed breves: corolla semipollicaris vel brevior, limbi rotato-expansi lobis 4-5 tubo mox longioribus. Glabra, foliis carnosiss.

2. *L. CAROLINIANUM*, Walt., Michx. — Coast of South Carolina to the Mexican boundary (Texas, Drummond, Coll. 2, 244). I have it not under the numbers of Berlandier cited by Miers. Filaments very densely tomentose-bearded for a short distance just above the insertion.

§ 3. Flores minores: corolla $\frac{1}{6}$ - $\frac{1}{2}$ -pollicaris, lobis tubo (sæpissime multum) brevioribus.

* Calyx profunde 5-fidus, lobis tubo suo longioribus corollæ angustæ apice breviter 5-lobæ dimidium fere attingentibus: pedicelli nulli vel brevissimi. Puberulæ, spinosæ.

3. *L. MACRODON* (sp. nov.): ramis junioribus pubescentibus; foliis glabratissimè spatulato-oblanceolatis enerviis fasciculatis (2-4 lin. longis); pedicellis brevissimis (ad summum sesquilinearibus); calycis minutum viscosi lobis anguste linearibus tubo breviter campanulato (sesquilineari) duplo longioribus; filamentis versus basin hirsutulis. — California, in the interior? Coll. Fremont in Expedition to California, 1849, Herb. Torr. Corolla half an inch long, narrow. Anthers oval-oblong, slightly if at all exserted.

The three following *Solanaceæ* of the Sandwich Islands, which I cannot refer to any known genus, are here characterized from materials

4. *L. PUBERULUM* (sp. nov.) : foliis obovatis vel oblongo-spathulatis subtus uniuerviis fasciculatis (4–8 lin. longis) cum ramulis gracilibus calycibusque minutim pruinoso-pubescentibus ; floribus sessilibus ; calycis lobis angusto-oblongis obtusis tubo subhemisphærico longioribus ; filamentis glabris. — Western borders of Texas, near El Paso, C. Wright, no. 1609. “A much branched shrub, 2 to 4 feet high ; tube of the corolla white, the margin yellowish-green.” Spines numerous and slender. Lobes of the calyx a line and a half long, very blunt. Corolla $4\frac{1}{2}$ or 5 lines long, the short lobes recurved, ovate ; the tube within pubescent below the insertion of the labrous filaments : anthers cordate-globular.

* * Calyx insigniter 4–5-dentatus, dentibus lanceolatis tubo suo parum brevioribus : pedicelli calyce breviores vel æquilongi. Glabræ vel fere glabræ, spiniscentis.

5. *L. BREVIPES*, Benth. Bot. Voy. Sulph. p. 40 ; Miers, l. c. p. 117, t. 69 C. — Lower California, Hinds and Barclay, Xantus, no. 89 ? without flowers or fruit. Our herbaria afford no materials for this species. We have nothing from that region, or indeed from elsewhere, with the calyx scarcely a line long, and yet longer than the pedicel, its teeth lanceolate and acute, and the corolla five lines long, or in the imperfect flower figured by Miers three lines long. A fragment in herb. Torr., from California, Rev. Mr. Fitch, somewhat accords with the character, except in the calyx-teeth, which are very short and broad.

6. *L. RICHII* (sp. nov.) : foliis spathulatis (3–5 lin. longis), novellis tenuissime puberulis vel fere glabris ; floribus tetrameris ; calyce campanulato pedicello (1–2 lin.) longiori vel æquilongo, dentibus lato-lanceolatis acutiusculis tubum subæquantibus ; corollæ (4 lin. longæ) tubo calyce et lobis ipsis duplo longiori intus glabro ; filamentis basi villosis. — La Paz, South California, Major Rich. California, Rev. A. Fitch (Herb. Torr.). The latter specimen has the young leaves minutely puberulent, the former scarcely if at all so. Teeth of the calyx inclined to become recurved-spreading. Lobes of the corolla 4, oval, not ciliolate, not exceeded by the filaments. Anthers oblong.

* * * Calyx breviter vel brevissime 4–5-dentatus, sæpe hinc vel bi-trilabiatis fissus, dentibus segmentisve latis.

— Subpuberulum : filamenta nuda vel basi vix pilosa (corollam haud superantia).

7. *L. FREMONTI* (sp. nov.) : foliis spathulatis ($\frac{1}{2}$ – $\frac{3}{4}$ -pollicaribus) cum pedicellis calycibusque tenuiter puberulis ; calyce cylindræo quam pedicellus gracilis breviori, tubo dentibus quadruplo longiori ; corolla tubulosa, tubo lobis 5 quadruplo longioribus ; filamentis prorsus glabris. (*L. near fragosum*, Miers, in herb. Torr. ; Torr. in Pacif. R. R. Exped. 4, p. (71) 127.) — Interior of California or country east of it, Fremont, Coll. Exped. 1849. Williams's Fork of the Colorado, between California and New Mexico, Dr. Bigelow, a form with narrower leaves and smaller, more slender flowers, — i. e. calyx about 2 lines and corolla $4\frac{1}{2}$ lines in length ; the tube of the latter pubescent inside in lines below the stamens ; while in the type of the species, the calyx is 3 lines, pedicels 4–7 lines, and corolla 6 lines in length ;

which are both scanty and imperfect. Attention being thus directed to them, perhaps these materials may be supplemented from some other

the latter, I believe, like the filaments, wholly glabrous; the lobes in both not ciliate. Anthers oval.

Var. β ? BIGELOVII: pedicellis abbreviatis calyce subturbinato (2 lin. longo) magis dentato vix æquilongis; filamentis corollaque intus basi parce hirsutulis. — Cañons of Williams's Fork of the Colorado, Dr. Bigelow. Perhaps a distinct species; but, as it was collected with one of the above specimens, and the materials of all three are scanty, I cannot venture to consider it so.

+ + Glabrum: filamenta basi villosa: pulvilli fasciculorum foliorum sæpius lanulosi. — Species a longifloris ad brevifloras ordinatæ.

8. *L. TORREYI* (*L. barbinode*, Torr. in Pacif. R. R. Exped. 5, p. 363, & Bot. Mex. Bound. p. 154, non Miers, Monogr.): foliis lanceolato-spathulatis crassiusculis (semi-subsesquipollicaribus); pedicellis fasciculatis (2-5 lin. longis); floribus pentameris; corolla tubuloso-infundibuliformi (5-6 lin. longa) calyce subæqualiter 5-dentato quadruplo longiori, lobis suis tomentoso-ciliatis. — Texas, on the Rio Grande, to Fort Yuma, interior of California, along the Mexican boundary, collected by Fremont, Major Thomas, Thurber, Bigelow, Schott, and Wright (1609, in herb. Gray, probably an error, as *L. puberulum* bears this number also: 1604 and 1608 in herb. Torr., but I have no *Lycium* under the former number). Calyx campanulate; the teeth about a third or more of the length of the tube, often tomentulose-ciliate. Lobes of the "blue or purple" corolla always bordered by a fine white tomentum, the throat or portion above the insertion of the stamens elongated and narrow, very gradually enlarging upwards, about one third of the length of the tube, nearly equalling the stamens. The flowers abundantly distinguish this species from the next, — for which, however, Mr. Miers mistook an insufficient specimen in herb. Torrey. We now have it in great abundance.

9. *L. BARBINODUM* (Miers, l. c. p. 115, t. 68, E.): foliis lineari-spathulatis (semi-subpollicaribus); pedicellis (sesquilineam longis) calycem æquantibus; floribus pentameris; corolla e tubo angusto superne campanulata (3 lin. longa) calyce sæpius fisso duplo-subtriplo longiori, lobis brevibus parce pilosulo-ciliatis. — Mexico, on the table land of Durango, Seemann, 2090. Unless a specimen of Thurber's collection from Sonora, in fruit only, belongs here, this species is known solely from Seemann's specimens: from one of these the above character is derived. It will be found to accord well with the description published by Miers, but not, as respects the shape of the corolla, with his figure. We ought not to rely too much upon this (as the following species shows); but the phrase "corollæ tubo imo coarctato, hinc repente campanulato . . . laciniis . . . margine subciliatis," accords perfectly with an authentic specimen in my herbarium. The corolla, moreover, is only about half the length of that of the preceding species.

10. *L. BERLANDIERI* (Dunal in DC. *L. stolidum* & *L. senticosum*, Miers, l. c.): foliis lineari-spathulatis seu linearibus basi attenuatis (4-7 lin. longis); floribus sæpissime tetrameris pedicello ($1\frac{1}{2}$ -3 lin.) subduplo vel parum longioribus; corolla (3-3 $\frac{1}{2}$ lin. longa) infundibuliformi fauce ampliata calyce brevi 3-4-plo longiori

collection. From the shape of the unripe seeds it is probable that the embryo is curved.

NOTHOCESTRUM, *Nov. Gen.*

Calyx campanulatus 4-dentatus vel subbifidus, immutatus. Corolla breviter hypocraterimorpha, limbo 4-partito, lobis ovatis æstivatione valvato-induplicatis. Antheræ 4, infra faucem insertæ, sessiles, lineares, inappendiculatæ, loculis introrsum longitudinaliter dehiscentibus. Discus hypogynus nullus? Ovarium globosum, estipitatum, biloculare, loculis pluriovulatis: stylus breviusculus: stigma bilobum: ovula subcampylotropa. Bacca calyce suffulta. Semina subreniformia, majuscula. — Arbores vel frutices, *Cestri* seu *Lycii* facie, Sandwicenses, foliis alternis integerrimis, pedunculis unifloris seu pedicellis in axillis foliorum solitariis vel fasciculatis.

NOTHOCESTRUM LATIFOLIUM (sp. nov.): foliis subpuberulis late ovalibus seu ovatis obtusis; corolla extus subsericea, tubo calyce breviter campanulato duplo longiore; bacca globosa. — Oahu, on the ridge of the Kaala Mountains. "Shrub about 12 feet high." Leaves membranaceous, about 2 inches long. Pedicels fascicled. Calyx 3 lines long. Corolla white? its tube half an inch long; the lobes not half the length of the tube, their margins strongly induplicate and the sinuses plaited. Anthers almost two lines long.

NOTHOCESTRUM LONGIFOLIUM (sp. nov.): glabrum; foliis oblongo-lanceolatis oblongisve basi attenuatis; pedunculis solitariis; calyce obtuse 2-4-dentato longiuscule campanulato; bacca (immatura) elongato-oblonga. — Oahu, on the mountains behind Honolulu, at

nunc breviter quadriloba nunc altius 4-fida. — Texas and the adjacent parts of Mexico along the Rio Grande, from its mouth to Monterey and to the borders of Arizona, Berlandier (1411, 1426, 1788, 3022), Gregg (199), Wright (540, 542, 1610), Bigelow, Thurber, Schott. Corolla "white," fully 3 lines long; the lobes varying from one fourth to one third the length of the undivided portion, or in the older flowers sometimes reaching almost to the middle. Stamens and style usually exerted. Calyx with 4 broad, blunt, equal or unequal teeth, sometimes splitting deeply on one or two sides. Berries red.

11. *L. PARVIFLORUM* (sp. nov.): foliis lineari-spathulatis (2-5 lin. longis); floribus tetrameris brevi-pedicellatis; corolla (2 lin. longa) calyce 2-3-plo longiori, fauce ampliata, lobis tubo dimidio brevioribus. — Arizona (Sonora), Thurber; also Dr. Parry, without indication of particular locality. Perhaps this may pass into the foregoing; but the flowers are smaller, and the corolla proportionally much shorter. Calyx either equally 4-toothed or 2-3-cleft. Stamens inserted very low down on the corolla. Pedicels a line or a line and a half in length.

the elevation of 1,500 feet. Leaves 4 to 7 inches long, thin. Pedicels 6 to 9 lines long. Corolla not seen. Testa of the immature seeds reticulated.

NOTHOCESTRUM BREVIFLORUM (sp. nov.): arboreum, fere glabrum; foliis anguste oblongis ellipticis; corollæ tubo calycem 2-4-lobum vix superante.—Hawaii, “between the Great Crater and the upper base of Mouna Roa. A tree 20 feet high, with the trunk 5 inches in diameter and the wood greenish: habit of *Solandra viridis*; the flowers greenish, but small.” Pickering. Leaves $2\frac{1}{2}$ to 4 inches long, rather coriaceous. Calyx $4\frac{1}{2}$ lines long, 4-nerved. Corolla, &c. nearly as in *N. latifolium*, but shorter. Fruit not seen.

Scrophulariaceæ.

CALCEOLARIA PETIOLARIS, Cav., is the name of this species, as written by Cavanilles; but every succeeding author, except Sprengel, has changed it to *C. petiolaris*, which makes a decided misnomer, and has caused already the introduction of two useless synonyms.

CALCEOLARIA BARTSIEFOLIA, Wedd. Chlor. And. Andes of Peru, above Baños. This we had thus named in our collection long before the appearance of Weddell's work, so obviously appropriate is the specific name.

CAPRARIA CALYCINA (sp. nov.): glabra, humilis; foliis lanceolatis seu linearibus paucidentatis, dentibus grossis divaricatis plerumque versus basim; floribus in axillis solitariis; calycis laciniis foliaceis pedunculo æquilongis seu longioribus corollam adæquantibus capsulam superantibus; staminibus 4; stigmatibus emarginato.—Hunter's River, New South Wales. The only ground of suspicion as to the correctness of the habitat is, that all the species before known are American. This is related to *C. biflora*: it differs in its solitary and short-peduncled flowers, and its calyx of twice the size, with lanceolate, foliaceous, accrescent divisions, in flower 4 lines, in fruit half an inch long, sometimes slightly denticulate.

Verbenaceæ.

LIPPIA SERIPHIODES (sp. nov.): fruticosa, intricato-ramosissima, puberulo-scabrida; ramis rigidis; foliis minimis ($1-2\frac{1}{2}$ -lin. longis) fasciculatis lineari-spathulatis cuneatisve sæpius trilobis margine revolutis; capitulis globosis demum elongandis ex axillis breviter pedunculatis solitariis vel subracemosis; bracteis ovatis concaviusculis calyce oblongo

breviter bifido brevioribus; antheris superioribus sæpe (non semper) e connectivo glanduloso-appendiculatis. — Rio Negro, North Patagonia, on the upland plain. This, I believe, occurs in the Hookerian herbarium, in the collections of Tweedie and of Gillies, and was by the latter called *Verbena rubiginosa*, a name never published, and now preoccupied in *Lippia*.

CLERODENDRON INERME, R. Br., var. β . OCEANICUM: foliis majoribus ($2\frac{1}{2}$ –5-pollicaribus) magis acuminatis; calyce truncato denticulis 5 minutis; cymis nunc 5–7-floris. — Samoan, Tonga, and Feejee Islands. This must be Forster's *Volkameria inermis*, and perhaps Sprengel's *Clerodendron Commersonii*. I have seen no intermediate forms (though they probably occur) between this and the true *C. inermis* of India, &c., which has smaller and blunter leaves, and, as described by Schauer, a distinctly 5-toothed calyx, "dentibus lato-triangularibus acutis."

CLERODENDRON, sect. TETRATHYRANTHUS. Limbus calycis et corollæ quadrilobus, fere regularis.

CLERODENDRON (TETRATHYRANTHUS) OVALIFOLIUM (sp. nov.): foliis ovalibus obtuse acuminulatis integerrimis basi subangustatis (cum petiolo ramisque teretibus) glabris; cymis plurifloris corymboso-paniculatis canescenti-puberulis; corolla hypocraterimorpha, tubo (ultrapollicari) calycem obtuse 4-lobum pluries excedentibus, lobis 4 rotundatis inter se æqualibus stamina adæquantibus. — Feejee Islands. Differs from the next somewhat in the foliage, but strikingly in the shape of the corolla.

CLERODENDRON (TETRATHYRANTHUS) AMICORUM (*Clerodendron Amicorum*, Seem. in Bonplandia, 10, p. 249): foliis ovali-seu cuneato-obovatis (9–11-pollicaribus) in petiolum brevem attenuatis integerrimis cum ramis subteretibus glabris; cymis multifloris corymboso-paniculatis canescenti-puberulis; corollæ tubo subinfundibuliformi calyce 4-lobo quadruplo lobis ipsis duplo triplove longiori; staminibus modice exsertis. — Samoan and Friendly Islands. Corolla stouter, its tube shorter (at most an inch long) and enlarging upwards, and the limb larger than in the preceding. The tetramerous flowers remind us of Labillardière's genus *Oxera*, of New Caledonia, but in all other particulars it is a *Clerodendron*. Since the above character was drawn up, Dr. Seemann has published the species as a new one, under the same name, comparing it with *C. inermis*, but without noticing the tetramerous character.

NESOGENES EUPHRASIOIDES, A. DC. (*Myoporum?* *euphrasioides*, Hook. & Arn.), which was collected upon several of the Coral Islands,—a plant with much the aspect of *Hedeoma pulegioides*, or of some *Lythrum*,—proves to be no shrub, but probably an annual, and no Myoporineous plant. The anthers are distinctly two-celled, and the ovules are erect. Without doubt it is a true Verbenacea, but I know not any genus which it particularly approaches. The generic character, as corrected and completed, is as follows:—

Char. gen. Calyx obconicus, 10-nervis, 5-dentatus, dentibus triangulatis, post anthesin auctis patentibus. Corolla bilabiata, labio superiori bipartito, inferiori tripartito, lobis rotundatis consimilibus, posticis paullo brevioribus. Stamina 4 fertilia, didynama, cum vestigio filamenti quinti: antheræ biloculares, didymæ, loculis paullo divergentibus (haud confluentibus) basi aristulatis. Discus hypogynus nullus. Ovarium ovatum, biloculare, loculis uniovulatis: stylus terminalis, filiformis: stigma parvum indivisum. Ovula e basi loculi erecta, anatropa. Drupa sicca, nucumentacea, parva, calyce inclusa, epicarpio tenuissimo, endocarpio crustaceo, bilocularis (vel dissepimento evanido unilocularis), disperma vel abortu monosperma. Semen cylindraceum, testa reticulata, albumine parco. Embryo teres: radícula infera cotyledonibus æquilonga. — Herba sesquipedalis, ut videtur annua, hirtello-scabra, caulibus nunc basi lignescentibus, ramis foliosis; foliis oppositis parvulis ovatis basi angustatis in petiolum attenuatis integerrimis, inferioribus quandoque suberenatis; floribus parvis in axillis sæpissime geminis; pedicellis calyce brevioribus minutissime bibracteolatis mox decurvis; corolla cærulescente?

Myoporineæ.

The ordinal character in the Prodrômus respecting the stamens, “absque vestigio quinti superioris,” disregards Brown’s character, “quandoque rudimentum quinti, raro polliniferi.” It may be indirectly made out that Brown here refers to *Myoporum*, and I suspect that he had a Sandwich Island representative of this group in view, in which the stamens are really isomerous with the lobes of the corolla in all the numerous flowers which I have been able to examine. This character in *M. Sandwicense*, (which has escaped the notice of all preceding observers, except, probably, of Brown, who must have had this plant under examination,) along with the increase in the number of the cells of the ovary, would fully warrant the establishment of a separate

genus. But the fifth stamen is wanting in *M. (Pentacælium) bontioides* of Japan, and in the allied *M. Chinense*. The Japanese species sometimes has the cells of the ovary reduced to four (unless there is a slip or misprint in Zuccarini's detailed description); while, on the other hand, one of the original species, *M. lætum*, Forst.,* has a 3-celled and 3-seeded putamen; and this not by the abortion of a half-carpel, for the ovary in the flower I examined was found to be trilocular with a single ovule in each cell. All this militates against De Candolle's primary division of the genera, and against the validity of his genus *Polycælium* (*Pentacælium*, Zucc.). The alternative evidently now is the establishment of two genera, *Polycælium* and *Pentacælium*, or their reduction to mere sections of *Myoporum*. The latter is, I confidently suppose, the better view, and the species in question may be disposed as follows:—

§ 1. PENTACÆLIUM (*Pentacælium*, Zucc.). Ovarium 4–6-sæpius 5-loculare. Stamina 4, didynama.

MYOPORUM CHINENSE. *Polycælium Chinense*, A. DC. Prodr. 11, p. 706. — China.

MYOPORUM BONTIOIDES. *Pentacælium bontioides*, Zucc. Fam. Nat. Fl. Jap. 2, p. 27, t. 3. *Polycælium bontioides*, A. DC. l. c. — Japan.

§ 2. POLYCÆLIUM. (*Polycælium*, A. DC. l. c. pro parte.) Ovarium 5–8-loculare. Stamina 5 vel 6, petalis isomera.

MYOPORUM SANDWICENSE (*M. tenuifolium*, Hook. & Arn. Bot. Beech. p. 93, vix Forst. & R. Br. *Polycælium Sandwicense*, A. DC. l. c.): glabrum; foliis oblongo-lanceolatis acutissime vel tenuiter acuminatis integerrimis, inferioribusve nunc parce serrulatis; fasciculis 3–8-floris; pedicellis petiolum subæquantibus; corolla late campanulata ad medium usque 5-fida; staminibus 5; drupa 4–8-loculari. Ludit floribus 6-meris 6-andris, foliis aut 2–3-pollicaribus angustis aut 3–5-pollicaribus multo latioribus. — Sandwich Islands, leg. Menzies, Beechey, Gaudichaud, Douglas, Nuttall (*Prinastrum cauliflorum*, Nutt. in Herb. Hook.), Remy (nos. 461, 462, 463), &c., on almost all the islands. Variable in the foliage, &c. One form is recorded as “a decumbent shrub”; another, as “a tree, forty feet high.” But no mention is made of its wood, which, according to Hooker and Arnott,

* “Stamens 5,” in the generic character of Hook. f. Fl. N. Zeal., is an evident lapsus or misprint.

on the authority of Menzies, has the fragrance of sandal-wood, and was formerly exported as such to China. Stamens all antheriferous and alike, or two of them frequently a little exceeding the others, or with larger anthers. Seed cylindrical : albumen thin, or sometimes wanting. Embryo cylindrical ; the cotyledons as long as the radicle.

Plantaginaceæ.

Notes upon the dimorphism and tendency to diclinism in the flowers of many species of *Plantago* have been published in Man. Bot. N. U. S., the Botany of the Mexican Boundary, and in Silliman's Journal for Nov. 1862, p. 419.

PLANTAGO ORBIGNYANA, Steinh. ex Decaisne, appears to be only an andine variety of *P. hirtella*, a perennial analogue of *P. Virginica*, and which, like that species, occasionally has the long-stamened and open-flowered form fruitful. Of the var. *Orbignyana*, only the form with short stamens and connivent-closed corolla is known. In our specimens, the style projects from the apex of the closed corolla in anthesis ; so that these flowers are not self-fertilized, as has been supposed, but cross-fertilized, as in analogous cases.

PLANTAGO PAUCIFLORA, Lam., Barnèoud, &c. (*P. barbata*, Forst., &c. *P. polymorpha*, Banks & Soland. *P. monanthos*, D'Urv., Hook. f. &c.) — Fuegia. The distinctions between *P. barbata* and *P. monanthos* have been reduced by Dr. Hooker to two ; viz. the want of beard at the base of the leaves in the latter, and the basal portion of the calyx scarcely exceeding the calyx in the former. The character derived from the beard would be expected to break down on consideration of Dr. Hooker's varieties of the two, and of what we know of other species. In fact, antarctic specimens with copious beard or wool, and with broad and toothed leaves, — and even some of Hooker's own, from Hermite Island, with long, narrow, entire leaves, — exhibit the funnel-shaped persistent portion of the capsule after dehiscence of twice or thrice the length of the calyx. Decaisne's distinctions in respect to the ovules and seeds are invalidated by Dr. Hooker's excellent figures, which represent four seeds in each cell of *P. monanthos*. These antarctic forms being evidently all of one species, Forster's name of *P. barbata*, being inapplicable to the whole species and not very much earlier than Lamarck's, may properly enough give place to the latter. I suspect that Dr. Hooker's specific diagnosis has been drawn between the common antarctic species and the following one, confused with

P. barbata of Forster. I have seen no Chilian specimens referable to the latter; but they very probably exist.

PLANTAGO UNCIALIS, Decaisne. (*P. pauciflora*, var. *major*, Barnèoud? *P. barbata*, var. *uncialis*, Wedd. *P. andicola*, Gillies in herb. Hook.) — High Andes of Chili, close to the snow. In this the globular-ellipsoidal, 4-seeded capsule dehisces below the middle, and the persistent portion is decidedly shorter than the sepals.

PLANTAGO PRINCEPS, Cham. & Schlecht. This remarkable species, of the Sandwich Islands, certainly includes *P. Queleniana* of Gaudichaud (as Chamisso suspected); and I am constrained to append to it the following as varieties, although they appear so different that they would naturally be taken for species. If so, many such are making in the Sandwich Islands.

Var. β . LAXIFOLIA: caule 1–2-pedali minus lignoso; foliis magnis (4–7-poll.) submembranaceis oblongo-lanceolatis ovalibus seu obovatis basi in petiolum alatum angustatis 7–9-plinerviis, basibus laxe imbricatis; capsula plerumque 4-sperma. — Hawaii, growing among stones by the sea-side, at the northern base of Mouna Kea.

Var. γ . HIRTELLA: foliis præsertim subtus cum pedunculis pilis crispatis hirsutis, petiolis angustis; capsula disperma: cæt. fere præcedentis. — On the tabular summit of Kauai.

PLANTAGO PACHYPHYLLA (sp. nov.): acaulis; caudice crassissimo lanato; foliis crasso-coriaceis ovali-oblongis ligulato-lanceolatisve integerrimis 5–11-nerviis glabratiss vel tomentulosis puberisve scapo multum brevioribus; spica elongata densiflora; floribus basi lanatis (denique sæpius glabratiss); bractea sepalisque ovatis obtusis vel obtusissimis; corollæ lobis ovatis obtusis vel obtusissimis vel post anthesin acutatis; ovulis in quoque loculo 2–4. — Sandwich Islands.

Var. α . MAVIENSIS: latifolia; foliis 9–11-nerviis (cum petiolo brevi lata 5–7 poll. longis $1\frac{1}{2}$ –2 poll. latis) subtus scapisque (pedalibus) lana decidua tomentosis; caudice erecto percrasso. Subsexus masculinus, staminibus (styloque) longe exsertis; ovulis in utroque loculo 2–4 haud gravidis. — Maui, on Mouna Haleakala, alt. 7,500 feet. Aspect of *P. Auklandica*.

Var. β . HAWAIENSIS: caudice repente minus lanato; foliis ovato-lanceolatis seu latiuscule lanceolatis seu lineari-ligulatis raro denticulatis 5–9-nerviis in petiolum breviusculum vel brevissimum attenuatis cum scapo (1–2-pedali) glabratiss vel hirsutiusculis, tomento sæpius evanido; sepalis plerumque ciliolatis capsula ellipsoidea 4–6-sperma

paullo brevioribus. — Subvar. *GRACILIS*, *longipes*; petiolo gracili 1 – 2½-pollicari lamina lanceolato-oblonga 3 – 5-nervi æquali; scapo gracili; spica laxiflora; capsula oblonga calycem subduplo superante. — Hawaii, on Mouna Kea and Mouna Loa to the elevation of 6,000 to 8,000 feet, and in the environs of the Great Crater. Subvar. *gracilis*, Hawaii, Remy, no. 429.

Var. γ. *KAVAIENSIS*: depauperata; foliis oblongis cum petiolo lato brevissimo 1½ – 2-pollicaribus; spica laxiflora cum scapo gracillimo semipedali: cæt. var. β. — Kauai, on the tabular summit. Aspect rather of *P. eriopoda*.

Barnèoud's *P. Brongniartii* (briefly described from a single specimen of Gaudichaud's collection, and not identified by Decaisne), on account of the narrow and very acute lobes of the corolla and the acute bracts, would appear to be rather a depauperate state of *P. princeps* than any other. Still, from its being ranked with *P. macrocarpa* and with *P. virescens* (which is *P. eriopoda*, Torr.*), and the leaves described as fleshy and obtuse, it may prove to be one of the depauperate forms of the polymorphous species here described.

2. *Additional Note on the Genus RHYTIDANDRA.* By ASA GRAY.

This genus I established on a flowering specimen in the Feejean collection of the South Pacific Exploring Expedition; and afterwards (in the Memoirs of the Academy, 5, p. 334, in 1854) I indicated its close relationship to *Marlea*. To the characters assigned, which should distinguish it from the latter, namely, the camerate anther-cells, the strictly one-celled ovary, and the bifid style with slender lobes, may be added the thin and deplanate epigynous disk. That of *Marlea* forms a large and globular stylopodium, well described by Endlicher, and figured by Clarke, and so conspicuous that it may have misled Bentham; or else there is some slip in his character, "ovary adhering to above the middle," in the Flora Hongkongensis.

But the object of this note is to state that specimens of *Rhytidandra Vitiensis* in fruit have now been detected among some undetermined

* *Plantago eriopoda*, Torr., includes *P. attenuata*, James in Long's Exped.; *P. lanceolata* γ & β (pro parte), Hook. Fl. Bor.-Am.; *P. virescens*, Barnèoud; *P. Richardsonii* and *P. oblongifolia*, Decaisne; *P. salsuginosa*, Nutt. ined.

plants of the collection. So that the detailed character of the genus may be completed as follows:—

Drupa ovata, subacuminata (ultra-semipollicaris), sarcocarpio tenui, putamine osseo ruguloso. Seminis testa membranacea: albumen carnosum copiosum, per cotyledones tenui-foliaceas orbiculares fere bipartitum: radicula supera cylindrica quam cotyledones dimidio brevior.

3. *Synopsis of the Genus* PENTSTEMON. *By* ASA GRAY.

PENTSTEMON, Mitchell, L'Her.

Sect. 1. EUPENTSTEMON. (*Pentstemonum* sect. 1–4, Benth. in DC.) Antherarum loculi per anthesin divaricati seu divergentes, usque (in *P. baccharifolio* vix) ad basin dehiscentes, apicibus pl. m. coadunatis.

§ 1. (ERIANATHERA, Benth.) Fruticuli vel suffrutices ramosissimi, foliis crasso-coriaceis parvulis. Inflorescentia stricte racemosa, nempe pedunculis fere semper unifloris. Corolla violacea seu purpurea, speciosa, leviter bilabiata, fauce ampliata. Antheræ lana longa densa præditæ! loculis usque ad summum apicem hiantibus, effætæ peltatim explanatæ. Am. Bor.-Occidentales.

1. *P. MENZIESII*, Hook. British Columbia to the Rocky Mountains, and those of California.—On comparison of all the specimens within reach, I confidently conclude that all the genuine members of this section (for *P. frutescens*, Lamb. cannot be of the group) are forms of one species,—for which *P. Menziesii* is the most appropriate name. *P. Scouleri*, Lindl. is the earliest published name under this genus; but that belongs to a form with narrowest leaves and sepals, which other botanists may keep distinct,—until they learn how small reliance can be placed upon the particular shape of the divisions of the calyx in this genus. The sterile filament varies from rather strongly bearded to almost naked. The forms which have been indicated as species are:—

a. *LEWISII*. (*P. Menziesii*, Hook. *P. Lewisii*, Benth. in DC. *Gerardia fruticosa*, Pursh.) Folia elliptica basi attenuata, seu obovato-oblonga, serrato-dentata: calycis segmenta lanceolata vel ex ovato lanceolato-acuminata.—Hartweg's no. 1878 and Bourgeau's from the Rocky Mountains have the broadest sepals, which are also glandular-pubescent.

β. DOUGLASII. (*P. Douglasii*, Hook., spec. fructif. *P. crassifolius*, Lindl. Bot. Reg. 24, t. 16, florif.) Folia integerrima, sæpius obovato-lanceolata: calycis segmenta ex ovato lanceolato-acuminata.

γ. SCOULERI. (*P. Scouleri*, Dougl., Lindl. Bot. Reg. t. 1277.) Folia obovato-lanceolata vel oblanceolata, plerisque argute serrata: calycis segmenta ex lanceolato attenuato-acuminata.

δ. NEWBERRYI. (*P. Newberryi*, Gray, in Pacif. R. R. Exped. 6, p. 82, t. 14.) Folia var. α. cum calycis fere var. γ.: corolla rubro-purpurea? — Dr. Newberry noted the corolla as "crimson." If really of the red series, I was justified in characterizing it as a new species; but I much suspect that the color is purple. The corolla is that of *P. Menziesii*, somewhat reduced in size.

§ 2. (FRUTICOSI.) Frutices vel suffrutices ramosi (3–6-pedales), ramulis floridis sæpe herbaceis, foliis coriaceis parvis parvulisve subpetiolatis. Inflorescentia paniculata pluriflora. Corolla bilabiata, labio superiore pl. m. arcuato-incurvo, inferiore deflexo vel patente. Antheræ glabræ, usque ad apicem dehiscentes, effætæ explanatæ. Californici.

* *Breviflori*; corolla profunde bilabiata ringente flavescente, labiis tubo æquilongis vel sublongioribus. Folia basi attenuata.

2. *P. MICROPHYLLUS*, Gray, in Pacif. R. R. Exped. 4, p. 119. Cinereo-puberula; foliis ramealibus primariis deciduis vel ad squamas minimas reductis, fasciculorum lineas 2 tantum longis obovatis retusis integerrimis; sepalis lanceolato-ovatis acutis. — Williams's Fork of the Colorado, between New Mexico and California. Corolla and stamens unknown. Probably allied to the next. A style that remains indicates a rather short corolla.

3. *P. ANTIRRHINOIDES*, Benth. Subcinereus, fere glaber, ramossissimus; foliis spathulato-lanceolatis oblongisve integerrimis; pedunculis diphyllis sæpius unifloris; sepalis ovato-rotundis; corolla lutea nuda, labiis amplis; filamento sterili superne dense barbato.

4. *P. BREVIFLORUS*, Benth. Floribus exceptis glaberrimus; foliis lineari-seu oblongo-lanceolatis argute serrulatis; pedunculis plurifloris; sepalis ex ovato acuminatis aut glabris aut glanduloso-hirsutis; corolla extus glanduloso-barbata flavescente intus purpureo tineta, tubo perbrevis; filamento sterili glabro. — The beard, generally so conspicuous on the summit of the unexpanded corolla, is sometimes almost wholly wanting.

- * * *Longiflori*; corolla (plerumque coccinea) longe tubulosa cylindrica, labiis brevibus, superiore erecto subincurvo, inferiore patente 3-partito.

+ Foliis basi attenuatis.

5. *P. TERNATUS*, Torr. Bot. Mex. Bound. p. 115; Gray, in Pl. Coll. Xant., no. 63, Jour. Bost. Soc. Nat. Hist. Fruticosus, glaber; foliis lineari-lanceolatis ternato-verticillatis denticulatis; sepalis lanceolato-ovatis; corolla "pallide coccinea" pollicari; filamento sterili a basi ad apicem valde barbato.

6. *P. CORYMBOSUS*, Benth. Decumbens; ramulis foliisque oblongis obtusis subintegerrimis pubescentibus; cyma corymbosa terminali; sepalis lineari-lanceolatis; filamento sterili glabro ex Benth. in spec. nostris longitudinaliter parce barbato. — Known only from Coulter's Californian collection, no. 629, and from good specimens gathered in Wilkes's Exploring Expedition.

+ + Foliis basi obtusis vel retusis.

7. *P. CORDIFOLIUS*, Benth. Sarmentosus, etiam scandens, pruinoso-puberulus vel glabratus; foliis ovatis vel subcordatis sæpe denticulatis parce dentatisve scabridis, venis supra impressis; floribus plerumque resupinatis; sepalis ovato-lanceolatis; corolla ultrapollicari coccinea; filamento sterili dense barbato. — "Runs over tall bushes like a *Lonicera*"; and, as the bright scarlet flowers are profuse, it would be a great acquisition to the gardens.

Probably a variety of this, or possibly an allied species, is the plant collected in Cajon Pass by Dr. Bigelow, in Whipple's Expedition, with vestiges of fruit only, which I unfortunately, but very doubtfully, referred to *P. Lewisii*.

§ 3. (AMBIGUI.) Suffruticosus, foliis coriaceis, inflorescentia paniculata. Corolla miniata, speciosa, superne ampliata, labiis brevibus, superiore suberecto, inferiore tripartito reflexo. Antheræ glabræ, reniformes, effætæ propter rimam leviter incompletam (nempe imam basim loculorum non attingentam) haud explanatæ.

8. *P. BACCHARIFOLIUS*, Hook. Bot. Mag. t. 4627; Gray, in Bot. Mex. Bound. p. 114. W. Texas, 439, 1479, coll. Wright. A well-marked, showy species; the anthers making a slight approach to the structure in the section *Saccanthera*.

§ 4. (ELMIGERA, Reichenb., sine char.) Herbæ, plerumque glaberrimæ, foliis integerrimis, caulinis sessilibus lanceolatis seu lineari-

bus, paniculis virgatis laxifloris. Corolla coccinea tubulosa, pl. m. bilabiata, labio superiore erecto concavo, inferiore patente vel deflexo. Antheræ glabræ, loculis a basi ad *subapicem* dehiscentibus, apice vero clausis, effœtis ergo haud explanatis. Filamentum sterile nudum.

9. *P. BARBATUS*, Nutt. Elatus, floribundus; corolla eximie bilabiata, labio inferiore deflexo ad faucem vulgo barbato; antheræ loculis (etiam in alabastro juniore divergentibus) maxime divaricatis.— Mexico; common.

β. *TORREYI*. (Gray, in Bot. Mex. Bound. p. 114. *P. Torreyi*, Benth. in DC. Prodr.) Corolla fauce minus barbata vel nuda, labiis vulgo (præsertim superiore) paullo longioribus.— Rocky Mountains in Colorado Territory to Northern Mexico. Clearly a mere form of *P. barbatus*, the name of which was not well chosen. (581, Fendl.; 440, 1474, Wright; 395, Hall & Harbour.)

γ. *WISLIZENI*. (*P. coccinea*, Engelm. in Mem. Wisliz., p. 107.) Pauciflorus, statura facie corollisque superne dilatatis *P. imberbis*, sed loculis antheræ divaricatis.— Chihuahua, Wislizenus. The specimens are quite intermediate between *P. barbatus* and *P. imberbis*, the corolla more bilabiate than in the latter, but less so than in the former, especially than in the var. *Torreyi*, the lobes of the lower lip broader, shorter, and apparently less recurved. The absence of beard in the throat is of small consequence; the strongly divaricate anther-cells assign the plant to *P. barbatus* in preference.

10. *P. IMBERBIS*, Trautv. (*P. Humboldtii*, Don. *Chelone imberbis*, H. B. K.) Sesquipedalis, laxiflorus; corolla superne sensim dilatata, labiis brevibus, inferiore haud deflexo nec recurvo; antheræ loculis diu parallelis (ut videtur nunquam divaricatis). Mexico. Under no. 1274 of Coulter's Mexican collection, I have both this and *P. barbatus*.

§ 5. (SPECIOSI.) Herbæ, plerumque glaberrimæ, foliis integerrimis, caulinis sessilibus, floribus thyrsoideo-paniculatis speciosis. Corolla e purpureo seu violaceo cærulea superne ventricosampliata, limbo breviter bilabiato, lobis rotundatis æqualiter patentibus. Antheræ laxe pilosæ vel hirsutulæ, vel in eadem specie nunc glabræ, loculis divaricatis a basi vix ad summum apicem dehiscentibus, effœtis haud explanatis.

11. *P. GLABER*. (*P. glabra*, Pursh. *P. Erianthera*, Nutt. in Fras. Cat., non Pursh. The latter name frequently inappropriate, not pub-

lished with a character, and applied by Pursh to a different species; so that Pursh's good name has priority, and is altogether to be preferred. *P. Gordoni*, Hook. Bot. Mag. t. 4319.) Glaberrimus; foliis sæpius glaucescentibus, caulinis lanceolatis seu ovato-lanceolatis; sepalis late ovatis margine submembranaceis aut muticis aut acumine nunc brevissimo nunc longiusculo terminatis; filamento sterili apicem versus breviter hirsuto, haud raro in stirpibus tam indigenis quam cultis pilis evanidis glabro. — Upper Missouri to the mountains of Utah and New Mexico.

β. OCCIDENTALIS. (*P. speciosus*, Dougl., Lindl. Bot. Reg. t. 1270.) Fere var. α; foliis caulinis vulgo angustioribus; antheris cum filamento sterili glabris. — Interior of Oregon, in and near the Rocky Mountains.

γ. ALPINUS. (*P. alpinus*, Torr., Benth. in DC. Prodr.) Humilior (4–12-poll.), strictior; sepalis e basi ovata seu oblongo-lanceolata sensim longe acuminatis. — Rocky Mountains, on both sides. (No. 259, coll. Parry.) This has the anthers and the tip of the sterile filament more commonly or more abundantly hairy than in the ordinary *P. glaber*, into which it manifestly passes. The acuminate portion of the sepal green, firm, and marginless.

δ. CYANANTHUS. *P. cyananthus*, Hook. Bot. Mag. t. 4464, raised from seeds from the upper valleys of the Platte, in the Rocky Mountains, I know only from the published figure. I had mistaken it for a large form of *P. acuminatus*, in Botany of Mexican Bound. Survey; but it clearly must stand next to *P. glaber*, var. *alpinus*; from which it appears to differ only in its greater height and robustness, large and dense thyrsus, and its broader (cordate-ovate) and acuminate upper cauline leaves. Probably it is no more than a particularly well-grown state of the above plant. All the varieties are showy, and the species is one of the handsomest in cultivation.

12. *P. STRICTUS*, Benth. in DC. Prodr. Glaberrimus, subglaucus, virgatus; caule gracili; panicula angustata; foliis caulinis longe linearibus; floribus vix evolutis fere *P. glabro* sed multo minoribus. — Wind River Mountains, near the sources of the Sweet Water of the Platte, Fremont. The specimen is too incomplete for much investigation. It may prove to be an extreme form of *P. glaber*.

13. *P. FREMONTI*, Torr. & Gray, ined. Pruinoso-puberulus, spithamæus et ultra; foliis imis spathulatis, caulinis lanceolatis sessilibus; panicula stricta spiciformi nuda, cymulis approximatis plurifloris brevissime pedunculatis; sepalis oblongo-ovatis acutis margine membranaceis; corolla (9 lin. longa) anguste infundibuliformi vix bilabiata;

antheris parce hirsutis; filamento sterili apice dilatato hinc barbato. — “On the Uinta plains, very abundant and in large patches. June 5, 1844.” Fremont. Clearly of this section, notwithstanding the pruinose pubescence.

§ 6. (GENUINI.) *Herbæ variæ*. Corolla aut modice aut vix bilabiata, labiis lobisve vulgo patentibus. Antheræ glabræ, valvulis haud raro denticulato-ciliatis, loculis a basi ad summum apicem usque rima continua dehiscentibus, effætæ apertæ, plerumque explanatæ.

* Undique glaberrimi glauci (summo caule *P. cæruleæ* quandoque excepto), foliis integerrimis coriaceis, caulinis arcte sessilibus seu amplexicaulibus: inflorescentia thyrsoidæa virgata, pedunculis cymularum plerumque brevissimis seu vix ullis tri- plurifloris: corolla superne pl. m. dilatata, vix bilabiata, lobis patentibus vel patentissimis planis.

+ *Cæruleiflori*; corollis haud pollicaribus læte azureis seu purpureo-cæruleis; filamento sterili apice sæpissime dilatato flavo-barbato.

14. *P. CÆRULEUS*, Nutt. (*P. angustifolius*, Nutt. in Fras. Cat., Pursh.) Spithamæus; foliis lineari-lanceolatis, superioribus apiceque caulis vulgo minutim pubescentibus; sepalis lanceolatis sensim acuminate marginæ sæpius ciliolatis albo-membranaceis. — Upper Missouri and Platte, etc. Nuttall probably included forms of the next species under his *P. cæruleus*, probably with good reason. The pubescence of the stem, not mentioned by Nuttall, is alluded to by Pursh. It is evident in a specimen said to be an original one of Bradbury's, in Rafinesque's, now Mr. Durand's, herbarium, in that of Nuttall, in herb. Acad. Philad. (from the Platte), and in that of Fremont from the Wind River Mountains, in Dr. Torrey's herbarium; — which are the only genuine ones before me. But the same thing, only perfectly glabrous and the sepals less white-margined, is Geyer's no. 154 (*P. cæruleus*, Hook. in Kew Jour. Bot. 3, p. 299); and also Richardson's specimens from the north, on which *P. acuminatus*, β . *minor*, Hook. Fl. Bor.-Am. is partly founded; and these pass insensibly into such specimens as Parry's no. 264, which is undoubtedly a narrow-leaved state of *P. nitidus*, Dougl. So that one ought really to add the next species to *P. cæruleus*, diverse as are the extreme forms.

15. *P. ACUMINATUS*, Dougl., Lindl. Bot. Reg. t. 1295. (*P. nitidus*, Dougl., Benth. in DC. Prodr. *P. secundiflorus*, Benth. l. c. *P. Fendleri*, Gray in Pacif. R. R. Exped. 2, p. 168, t. 5, & in Bot. Mex.

Bound. p. 114, excl. syn. *P. cyananth.*) Spithamæus ad sesquipedalem; foliis radicalibus spathulatis, caulinis lanceolatis oblongis ovato-lanceolatis vel præsertim superioribus subcordatis rigidis læte glaucis; thyrso elongato floribundo; sepalis aut ovatis aut lanceolatis corolla 6–10 lin. longa; capsula acutissime acuminata. — Saskatchewan and interior of Oregon, along the mountains and elevated plains to Chihuahua. (No. 576, Fendler; 245 and 463, Wislizenus; 1473, Wright; 258, Parry, a form nearly similar to *P. secundiflorus*, Benth.; 264, Parry, and 390, Hall and Harbour, passing to *P. cæruleus*.) Lindley, in publishing *P. acuminatus*, describes the sterile filament as slightly hairy and hooked at the point, but figures the tip dilated. So I find the tip dilated and more or less yellow-bearded in the only flowering specimens I have from the interior of Oregon, collected by Mr. Spalding. Bentham's character, "filamento sterili filiformi glabro," which has been misleading, I have verified only in Hall and Harbour's no. 385, which in other respects is just *P. secundiflorus*. There is no question about the propriety of reducing all these synonymes to *P. acuminatus*.

+ + *Grandiflori*; corollis sesquipollicaribus speciosissimis; foliis caulinis præsertim superioribus rotundatis amplexicaulibus vel connatoperfoliatis; sepalis haud acuminatis; filamento sterili apice adunco leviter dilatato: cymulis 2–5-floris absque pedunculo communi.

16. *P. GRANDIFLORUS*, Nutt. (*P. Bradburii*, Pursh.) Tripedalis; foliis omnibus distinctis; pedicellis abbreviatis; corolla subito inflata cæcio-cærulea; filamento sterili apice vix barbulato. — Wisconsin and Iowa to Kansas. A very handsome species in cultivation, and the earliest to flower. It is singular that it has not yet been figured. I have never observed the sterile filament bearing a small two-lobed anther, as Nees records in Prince Neu-Wied's Travels; on the contrary, in the plants now for many years cultivated in the Cambridge Botanic Garden, this filament is absolutely wanting in about one blossom out of twenty.

17. *P. MURRAYANUS*, Hook. Bot. Mag. t. 3472. Bi-tripedalis; foliis superioribus floralibusque in laminam orbiculatam connatis; pedicellis gracilibus; corolla sursum modice sensim ampliata læte rubra; filamento sterili glaberrimo. — E. Texas (coll. II. 292, Drummond; 282, Lindheimer, &c.) and Arkansas. In Mr. Durand's herbarium is a specimen of *P. Murrayanus* from T. J. Hale of Wisconsin, said to have been found at Dubuque, Iowa (where Dr. Hor collects *P. grandiflorus*); but I suspect there is some mistake about it.

+ + + *Rubriflori*; corollis vix ultrapollicaribus rubris vel coccineis; foliis inferioribus oblongis, superioribus subovatis seu lanceolatis amplexantibus; caulibus sæpius elatis.

18. *P. CENTRANTHIFOLIUS*, Benth. (Hook. Bot. Mag. t. 5142.) Sepalis lato-ovatis; corolla pollicari kermesina tubulosa superne vix ampliata, limbo brevi æquali; filamentis sterilibus glaberrimis. — California. The corolla is bright carmine, the lobes equal, except that the two upper are united higher, and equally spreading, scarcely longer than the breadth of the throat.

19. *P. PUNICEUS*, Gray in Bot. Mex. Bound. p. 113. Cymulis plurifloris densioribus; sepalis ovatis seu oblongis; corolla pollicari vel minore læte coccinea tubulosa fauce leviter ampliata, limbo amplo sub-æquali, lobis rotundatis; filamentis sterilibus sub apice barbato. — Arizona.

20. *P. WRIGHTII*, Hook. Bot. Mag. t. 4601. Cymulis paniculæ laxè virgatæ paucifloris; sepalis oblongis apice patentibus; corolla haud pollicari læte roseo-rubra superne ventricoso-dilatata, limbo amplo, lobis rotundatis patentissimis, filamentis sterilibus hinc longe denseque barbato. — W. Texas and Arizona. Length of the corolla and breadth of its limb about equal.

* * Undique glaberrimus, subglaucus, elatus; foliis crebre seu ovato-lanceolatis coriaceis, caulibus superioribus in laminam amplexicaulem connatis: panicula laxa, elongata, cymulis 3-9-floris pedunculatis: corolla (pollicaris) cæruleo-purpurea, tubo superne inflato, limbo bilabiato, lobis latissimis patentissimis; filamentum sterile glabrum.

21. *P. SPECTABILIS*, Thurber, in Pacif. R. R. Exped. 4, p. 119 (63), & Bot. Mex. Bound. l. c.; Hook. Bot. Mag. t. 5260. — California to W. Texas. (1475, Wright.)

* * * Glabri præter inflorescentiam calyces corollasque minutim viscoso-pubescentes; foliis lanceolatis, vel superioribus e basi dilatata amplexicauli ovato-lanceolatis sensim acuminatis integerrimis: panicula laxa, pedunculis paucifloris: corolla sesqui-bipollicaris, lobis subæqualibus patentibus: filamentum sterile fere glabrum. Mexicani.

22. *P. GENTIANOIDES*, Don. (*Chelone gentianoides*, H. B. K. Nov. Gen. & Sp. 2, t. 172.) Corolla violacea, vix sesquipollicaris, supra

calycem usque ad faucem valde ampliata campanulata: pedunculi abbreviati.

23. *P. HARTWEGI*, Benth. (*P. gentianoides*, Bot. Reg. 1838, t. 3; Bot. Mag. t. 3661.) Corolla bipollicaris, coccinea vel sanguinea, superne sensim leviter dilatata tubuloso-infundibuliformis: pedunculi 2-3-flori elongati.

* * * * Undique fere glabri; foliis pinnatipartitis, segmentis angusto-linearibus: panícula laxiflora: corolla purpurea, haud pollicaris, superne ampliata, lobis subæqualibus: filamentum sterile apice barbatus.

24. *P. DISSECTUS*, Ell. Bot. 2, p. 129; Chapm. Fl. p. 289.—Georgia.

* * * * * Glabri, vel pruinoso- seu viscoso-puberuli, angustifolii; foliis filiformi-subulatis linearibus vel lineari-spathulatis, omnibus integerrimis; racemo simplici seu panícula virgata laxiflora. (Cf. spp. subsequentis foliis quandoque integerrimis glabris.)

+ Inflorescentia stricte racemosa, i. e. pedunculis unifloris, infimis rarissime bifloris; corolla vix bilabiata.

++ Foliis angustissimis fere filiformibus glabris.

25. *P. TENUIFOLIUS*, Benth. Elatus, ramulosus, foliosus, subpuberulus; racemo elongato laxo; corolla (pollicari purpurea?) superne valde ampliata, lobis brevibus; filamento sterili imberbi. — Mexico.

26. *P. LARICIFOLIUS*, Hook. & Arn. (*P. filifolius*, Nutt. ined.) Semipedalis, cæspitosus; caudicibus crebre foliatis; caulibus floridis gracilibus simplicibus; racemo 4-8-floro; corolla (semipollicari purpurea), tubo superne ampliatus; filamento sterili barbato. — Utah.

27. *P. AMBIGUUS*, Torr. in Ann. Lyc. N. Y. & Marcy, Rep. t. 16. Subpedalis ad bipedalem, paniculato-ramosus e basi lignescens; foliis inferioribus linearibus basi attenuatis, superioribus subulato-filiformibus vel aceroso-subulatis; racemis laxifloris; corolla ("alba purpureo tincta" 5-8 lin. longa), limbo amplo patentissimo pl. m. obliquo; filamento sterili glabro. — Rocky Mountains of Colorado Territory to Arizona. — Forma vera: corollæ tubo semipollicari sæpius incurvo superne vix dilatato, limbo explanato semipollicem diametro, fauce fere undique hirsutula; filamento sterili quandoque antheram parvam gerente. — To this belong Bentham's var. *foliosus*, Fendler's no. 569 (probably, for the flowers are wanting), 459, &c. of Wislizenus, 1471 of Wright,

742 of Thurber, &c. But some of Wright's specimens, and no. 74 and a part of 15° of Wislizenus's, have the tube of the corolla as short and funnel-shaped as in the following.

β. THURBERI (*P. Thurberi*, Torr. in Pacif. R. R. Exped. 7, p. 15, bot. appx.). Corolla minor, brevior, haud semipollicaris, tubo magis dilatato, fauce lineis 2 barbatis antice instructa. — Here belong Dr. Antisell's specimens from the Burro Mountains, and Thurber's 1056 from Ojo de Gavilan, New Mexico, as described by Dr. Torrey, from Prof. Thurber's notes. The distinctions are well taken; but the specimens mentioned above make me hesitate to admit the species.

++ ++ Foliis lineari-lanceolatis seu lineari-spathulatis sæpius puberulis vel pruinoso-pubescentibus; caulibus basi lignescentibus.

28. *P. GAIRDNERI*, Hook. Fl. Bor.-Am. Spithamæus, basi ramosissimus; pedicellis brevibus oppositis vel alternis; sepalis glanduloso-viscosis; corolla semipollicari; filamentis sterilibus longitudinaliter barbato. — Mountains of the Northwest Coast. The naturalists of Wilkes's Expedition collected a flowering specimen in Washington Territory.

29. *P. DASYPHYLLUS*, Gray in Bot. Mex. Bound. p. 112. Pruinoso-vel subglanduloso-puberulus; caule subsimplici; racemo laxo paucifloro; pedicellis alternis vix bracteolatis; corolla purpureo-cærulea fere sesquipollicari; filamentis sterilibus glabris. — Arizona and New Mexico. (1478, Wright.)

+ + Inflorescentia racemoso- seu virgato-paniculata, pedunculis plerisque 2 – 5-floris; sepalis ovatis; caulibus erectis vulgo simplicibus.

++ Ultrapedalis; pedunculis alternis brevibus 1 – 2-floris; corollis puniceis subpollicaribus.

30. *P. LANCEOLATUS*, Benth. Pruinoso-puberula vel glabella, pedicellis calycibusque subglandulosis; filamentis sterilibus glabris. — Mexico; 184, Hartweg; 57 and probably 441, Gregg. In my specimens of Hartweg's collection, as in others, I do not always find the "pedunculi communes subnulli"; but some of them are uniflorous.

++ ++ Bi-tripedalis; pedunculis oppositis elongatis 2 – 5-floris; panicula quam in cæteris laxiori; corollis "cæruleis" (an purpureis?) superne ampliatis sesquipollicaribus.

31. *P. STENOPHYLLUS*, Gray in Bot. Mex. Bound. p. 112. Glaber, foliis linearibus 3 – 4-pollicaribus, superioribus minoribus angustissimis;

filamento sterili glaberrimo. — Mexico, Cosiquiriachi, Wislizenus, 186. Arizona, 1477, Wright.

++ ++ ++ Semi-sesquipedalis, cum foliis sæpius minutissime pruinoso-puberulus; pedunculis pedicellisque brevibus; corollis purpureis ultra-semipollicaribus, fauce valde ampliata, limbo breviter bilabiato, labio superiore minus patente.

32. *P. VIRGATUS*, Gray, l. c. Caule e basi simplicissimo; foliis linearibus seu lineari-lanceolatis $1\frac{1}{2}$ –4-pollicaribus; panicula elongata angustissima multiflora nunc secunda, pedunculis plerumque oppositis; corolla roseo-lilacina; filamento sterili glaberrimo. — New Mexico; 580, Fendl.; 1476, Wright.

33. *P. LINARIOIDES*, Gray, l. c. Multicaulis e basi suffrutescente, cinereo-pallidus, foliosissimus; foliis (pollicaribus vel brevioribus) inferioribus spathulato-superioribus angustissimo-linearibus, floralibus subulatis; panicula angusta subsecunda; pedunculis omnibus alternis, inferioribus 2–5-floris, superioribus unifloris; corolla pallide cæsio-purpurea, palato barbato; filamento sterili longitudinaliter barbato. — New Mexico and Arizona; 1472, Wright; 331, 1115, Thurber.

+ + + *Axilliflori*, nempe ramis (e caulibus cæspitoso-humifusis) usque ad apicem subæqualiter foliosis.

34. *P. CÆSPITOSUS*, Nutt. in herb. Acad. Philad. (*P. pumilus*, Benth. quoad pl. Fremont., non Nutt.) Depressus, cinereo-puberulus; ramis confertis e basi humifusa vel repente adscendentibus foliosissimis (1–3 poll. longis); foliis lanceolato-seu lineari-spathulatis mucronato-apiculatis aveniis (5–9 lin. longis); pedunculis axillaribus brevibus secundis mox decurvo-patentibus apice folioso-bibracteatis flores 1–3 assurgentes brevi-pedicellatos gerentibus; sepalis e basi latiore marginibus scariosa lineari-lanceolatis foliaceis; corolla (6–9 lin. longa) cæruleo-purpurea tubulosa, tubo superne sensim subampliato intus plicis 2 intrusis percurso, limbo breviter bilabiato, lobis subæqualibus; filamento sterili longe barbato. — Rocky Mountains, Nuttall (a diminutive specimen in herb. Acad. Philad.), Fremont (a poor specimen in herb. Torr.), Parry, Hall and Harbour, coll. 1862 (no. 393), at the Middle Park, also on “rocky ledges of the upper Platte, growing in spreading decumbent patches: flowers blue, with purplish tips, and streaked with pink lines, first found by Mr. J. Harbour.” Parry in litt. Very fine and full specimens (received as this article is going to press) are given in the recent collection above men-

tioned, both of the form gathered by Nuttall, with the leaves only about half an inch long and scarcely a line wide, and of a luxuriant form, with larger leaves, and flowers three fourths of an inch long on longer pedicels. The leaves on decumbent branches are all turned to the upper side, and often falcate, while the peduncles are rigidly turned to the lower side of the branch. The species is a well-marked one, and the most dwarf of the genus.

* * * * * Aut pl. m. pruinoso- seu viscoso-pubescentes, aut serratifolii, aut panicula interrupta cymulis densifloris : inflorescentia sæpius thyrsoides ; corolla nunquam coccinea.

+ Boreali-Americani ; corollis haud rubris.

++ Filamento sterili longitudinaliter flavo-barbato ; corolla superne campanulato- seu infundibuliformi-ampliata parum bilabiata.

a. Foliis lanceolatis subintegerrimis, saltem superioribus floribusque viscoso-pubescentibus ; panicula stricta, pedunculis brevibus appressis.

35. *P. PUMILUS*, Nutt. Forte *P. albidus* forma alpina, nana (3–4 pollicaris), pauciflora, foliis caulinis basi paullo attenuatis, corolla glabriuscula. — Little Goddin River in the Rocky Mountains, Wyeth. Fremont's specimen, referred here in the Prodrômus, must belong to the preceding species.

36. *P. ALBIDUS*, Nutt. (*P. teretiflorus*, Nutt. in Fras. Cat. *P. viscidulum*, Nees, Bot. Appx. in Neu-Wied. Trav. p. 18.) Subpedalis ; foliis majoribus sæpe oblongo- seu ovato-lanceolatis ; panicula quasi spicata subverticillatim interrupta cymulis plurifloris vel in depauperatis pauciflora ; sepalis lanceolatis viscido-pubescentissimis ; corolla $\frac{3}{4}$ -pollicari e purpureo albida, tubo superne sensim modice ampliata, limbo imberbi ; barba filamenti sterilis breviuscula subinterrupta. — Upper tributaries of the Missouri to W. Texas.

37. *P. CRISTATUS*, Nutt. (*P. erianthera*, Pursh, non Nutt.) Subpedalis ; panicula spiciformi, cymulis 3–4-floris ; sepalis lineari-lanceolatis attenuatis hirsutissimis ; corolla pollicari violaceo supra calycem late infundibuliformi-ampliata, labio inferiore intus et filamento sterili pilis longis insigniter barbatis. — Upper Missouri to the Rocky Mountains.

38. *P. JAMESII*, Benth. (*P. albidus*, Torr. in Ann. Lyc. pro parte.) Spithamæus ad pedalem, puberulus ; foliis lineari-lanceolatis sæpe denticulatis rigidis ; inflorescentia præcedentis ; sepalis lanceolatis e

basi sat lata gradatim attenuatis viscido-puberulis; corolla ultrapollinari pallide purpurea supra calycem subito inflata campanulata, labio intus vix barbato; filamento sterili minus quam in *P. cristato* barbato. — Eastern side Rocky Mountains and vicinity, to New Mexico (575, 579, Fendler) and the adjacent parts of Texas. Nearest to *P. cristatus*, from which it plainly differs in the narrower leaves, more abruptly ampliate corolla, shorter and less abundant beard, and the calyx more viscid-puberulent, as in *P. albidus*.

b. Foliis latioribus sæpius serratis, caulinis plerisque amplexicaulibus; panicula vulgo nuda laxiflora.

39. *P. COBÆA*, Nutt. Pedalis, raro bipedalis, viscoso-puberulus; foliis ovatis oblongisve argute serratis vel denticulatis; panicula pauciflora cum sepalis oblongis vix acutis viscoso-pubescente; corolla bipollicari ex albedo purpurascens supra calycem subito inflata late campanulata intus glabra. Kansas to Texas. (142, Lindheimer; 577, Fendler; 1834, Berlandier, depauperate.)

40. *P. DIGITALIS*, Nutt. Elatus (3–5-pedalis), præter flores pl. m. viscosos sæpissime glaberrimis; foliis tantum serrulatis, caulinis (3–6-pollicaribus) lanceolatis vel superioribus ovato-lanceolatis e basi lata sursum sensim attenuatis; thyrsos nudo laxo plurifloro; corolla ultrapollinari alba superne e tubo angusto campanulato-ampliata, lobis brevibus subæqualibus, filamentum sterili parcius barbato. — Illinois to Arkansas, Louisiana, and Georgia.

β. *MULTIFLORUS*, Chapman, Fl. (*P. multiflorus*, Chapman, ined. *P. crassifolius*, Shuttlew., fide Benth.) is I suppose rightly placed by Dr. Chapman under this species, — a form from the pine barrens of Florida and Georgia, with the corolla smaller and narrower, less abruptly ampliate. But I have not seen sufficient materials.

41. *P. TUBIFLORUS*, Nutt. — judging from the insufficient specimens cited in the Prodrômus (from Herb. Torr.), where the name of “Engelman” should be Leavenworth — is probably a slender variety of *P. Digitalis*, with the corolla less ampliate, tubular-funnel-form, and the sterile filament less bearded. But sufficient materials are not in hand. — Arkansas.

++++ Filamento sterili longitudinaliter saltem secus apicem dilatatum flavo-barbato; corolla minus ampliata (*P. glauco* excepto) evidentius bilabiata. *Cismontani* vel *montani*; inflorescentia haud glomerato-condensata.

- a. Multiflori; panicula thyrsoides vel racemiformi nuda, foliis (caulinis aut argute serrulatis aut subintegerrimis) superioribus ad bracteas parvas diminutis, pedunculis vulgo tri-plurifloris; corollæ labio superiore sæpius parum brevior.

These species with the two preceding, all very difficult of definition in the herbarium, need re-examination in the living state. I have examined fresh flowers only of *P. Digitalis* and *P. pubescens*,—than which no two species are more clearly distinct, although in dried specimens they may not always be readily identified. From the shape of the corolla, *P. glaucus* should also be re-established. And I am obliged to intercalate an unpublished species of Nuttall, *P. humilis*, between the latter and *P. gracilis*, Nutt., here reduced to *P. pubescens*. The two new species which follow are choice fruits of Messrs. Parry, Hall, and Harbour's collection, during the present season, which, with other good materials, have come to hand just in time to find a place in this article as it is passing into the printer's hands (November, 1862).

42. *P. PUBESCENS*, Soland. (*P. lævigatus*, Soland. *P. hirsutus*, Willd. *P. Mackayanus*, Hortul.) Sub-1-3-pedalis, viscoso-pubescent vel fere glaber; foliis caulinis (nunc lineari- nunc ovato-) lanceolatis; thyrsis laxifloris; corolla albida cærulescente vel purpurascente superne sensim paullo ampliata leviter obcompressa sub labio inferiore plicis 2 intrusis sursum barbatis percursa, fauce subclausa; filamentis sterilibus deorsum longe denseque barbato.—Canada to Florida and Texas. In the fresh flowers the two introrse plicæ of the lower side of the corolla, and the throat somewhat closed by the approximation of the base of the lower lip to the rather fornicate upper one, are characteristic.

β. *GRACILIS*. (*P. gracilis*, Nutt.; Bot. Mag. t. 2945, excl. descr. Graham; Bot. Cab. t. 1541.) Subglaber; foliis caulinis et thyrsis angustatis; corolla vulgo graciliori, plicis haud barbatis.—Saskatchewan to Texas. Clearly this is only a slender variety of *P. pubescens*, with the flowers commonly rather narrower, and its beard (always unreliable in this genus) reduced to some scattered hairs on the lower lip. Intermediate forms abound.

43. *P. HUMILIS*, Nutt. in herb. Acad. Philad. *P. gracili* Nutt. (*P. pubescenti* var. *gracili* supra) maxime affinis, sed vulgo humilior (3-9-pollicaris), foliis pallidioribus, thyrsis etiam strictiore, corolla saturate cærulea brevior (haud ultra-semipollicari) fauce satis ampliata hiante plicis sub labio inferiore obsoletis.—Rocky Mountains, Nuttall

(a very depauperate doubtless alpine specimen in herb. Acad. Philad.); common about Pike's Peak and vicinity, Parry, no. 257 (Enum. p. 27), Mr. Howard, and in taller specimens than before seen, Hall and Harbour, 1862, no. 387, on low mountains, "an early and very pretty species," confirming its close relationship with *P. gracilis*. Yet this cannot be regarded as a variety of *P. pubescens*.

44. *P. GLAUCUS*, Graham; Lindl. Bot. Mag. t. 1286. Spithamæus ad ultrapedalem, præter inflorescentiam floresque viscosos glaber; foliis subglaucis, (radicalibus subovatis,) caulinis lanceolatis seu basi dilatata ovato-lanceolatis; thyrsosubcompacto (sepalis ovato-lanceolatis); corolla pollicari supra basim ventricoso ampliata lilacina seu violacea, fauce ampla hiant, plicis sub labio inferiore (pilis longis parce villosis) vix ullis. — Saskatchewan, or in the Rocky Mountains, Drummond.

Var. β . *STENOSEPALUS*: thyrsosubcompacto; sepalis lanceolatis longe attenuato-acuminatis. *P. glaucus*, Gray, Enum. Pl. Parry, p. 27. Rocky Mountains, about Pike's Peak, Clear Creek, &c., Dr. James in herb. Torr., Dr. Parry, 261, 262, and coll. 1862, distributed by Hall and Harbour, 399. — Corolla, as in the figure *P. glaucus* in the Botanical Register, abruptly much ampliate, almost as much so as that of *P. Digitalis*, but more gibbous, very distinctly bilabiate, the lower lip a little exceeding the upper.

45. *P. HALLII* (sp. nov.). Nanus, 3–5-pollicaris, multiceps, præter inflorescentiam calycesque (occulo armato) minutissime glandulosos glaber; foliis glauco-pallidis integerrimis lineari-spathulatis seu linearibus basi attenuatis; thyrsosubcompacto vel potius racemo simplici 4–10-floro, pedicellis calyce brevioribus; sepalis ovatis oblongisve margine late scariosis sæpius erosis; corolla subpollicari e basi brevissima inflata ventricoso-campanulata cæruleo-purpurea, labiis brevibus subæquilongis, superiori fere ad medium bilobo inferiori trilobo intus glabro, filamentis sterilibus hinc barbato. — Rocky Mountains near Clear Creek, &c., in the alpine region, coll. 1862, Parry, Hall and Harbour: no. 388 distributed by Hall and Harbour. — A most beautiful species, from the size of the flowers as compared with that of the stem, and their bright color. Corolla nearly an inch long, more inflated than that of *P. glaucus*, the contracted base being very short, decidedly bilabiate, but the lips only 3 or 4 lines long, very deeply colored; the tube appears much paler. Radical and lower cauline leaves one or two inches long, including the narrowed base or petiole, $1\frac{1}{2}$ to 2 lines wide towards the summit, thickish; the floral ones reduced to 6 or 3 lines long, and scarcely at all

dilated at the insertion. Flowers solitary or in pairs in the axils, the short peduncle usually bibracteate, forming a short racemose inflorescence. Beard of the sterile filament short, but copious and extending well down one side. This charming *Pentstemon* may appropriately bear the name of one of its zealous discoverers.

b. Bi-triflori; caulibus usque ad apicem æqualiter foliatis; pedunculis unifloris plerisque ebracteatis; corollæ tubo vix gibboso, labiis æquilongis.

46. *P. HARBOURII* (sp. nov.). Nanus, 2-4-pollicaris; caulibus multicapitibus pruinoso-puberulis usque ad apicem 2-3-florum æqualiter foliosis; foliis fere glabris crassiusculis obovatis oblongisve obtusissimis integerrimis vel repandis; pedicellis alternis cum calyce subæquilongo viscoso-pubescentibus; sepalis ovatis breviter acuminatis seu lato-lanceolatis margine haud scariosis; corolla purpurea (7-9 lin. longa), tubo cylindraceo limbo breviter bilabiato, labio superiori profunde bilobo, inferiore profunde trilobo intus ad faucem hispido-barbato; filamento sterili apice dilatato hinc deorsum barbato. — Rocky Mountains of Colorado Territory, in the high alpine region, no. 396 of Hall and Harbour's distribution; found only by Mr. J. P. Harbour, whose name it should bear. Leaves thickish, glabrous or minutely pruinose, 4 to 8 lines long, 3 to 5 lines wide, sometimes retuse; the uppermost closely sessile by a more or less narrowed base, the lowest, or those of sterile shoots, ovate and tapering into a slender petiole. Pedicels in the axils only of the uppermost leaves, and alternate, in flower $1\frac{1}{2}$, in fruit 2 or 3 lines long. Corolla bluish purple, slightly viscous-pubescent; the tube slightly widening upwards; the lips about 3 lines, the similar and spreading rounded lobes $1\frac{1}{2}$ to 2 lines long; a copious and rather stiff beard in the throat or on the base of the lower lip. Capsule not exceeding the calyx.

++ ++ ++ Filamento sterili apice barbato: corolla manifeste bilabiata, tubo vix aut ne vix ampliato. *Transmontani*, panicula interrupta, cymis multifloris condensatis, floribus pro genere parvis 5-8 raro 9-11 lin. longis.

a. Serratifolii; foliis ovatis seu ovato-lanceolatis sæpius argute dentatis, caulinis superioribus basi subcordata amplexicaulibus; sepalis vix scarioso-marginatis; floribus minus confertis.

47. *P. OVATUS*, Dougl. Puberulus, latifolius; sepalis ovatis seu lato-lanceolatis; corolla purpureo-cærulea. Oregon to British Columbia.

48. *P. PRUINOSUS*, Dougl. Pubescens; foliis cæsiis; inflorescentia (sæpe quasi verticillata) et præsertim sepalis (lanceolatis longe attenuato-acuminatis) viscoso-villosis; corolla læte cyanea. — Priest's Rapids of the Columbia River; found only by Douglas, long ago lost from the gardens.

β. *Integrifolii*; foliis glaberrimis fere semper integerrimis, caulinis lanceolatis oblongisve; sepalis saltem marginibus albo-scariosis; palato vulgo barbato; thyrsos spiciformi interrupto sæpius quasi verticillastrifloro.

49. *P. ATTENUATUS*, Lindl. Bot. Reg. t. 1295. Sesqui-bipedalis; foliis raro paucidenticulatis; inflorescentia villosa seu pl. m. viscoso-pubescente; cymis plerisque breviter pedunculatis; sepalis ovato-lanceolatis anguste scarioso-marginatis; corolla ochroleuca vel cæruleo-purpurea ultra-semipollicari. — Lewis and Clarke's or Kooskooskie River. The figure in the Bot. Register depicts the flowers as ochroleucous. Bentham writes, "corolla sulphurea." But in similar specimens collected on the Kooskooskie by the naturalists of Wilkes's Expedition it is noted that the "corolla is blue"; while Hooker remarks that those of Douglas's specimens were purple. The color is probably vari-ous. Mr. Spalding's specimens from Clearwater, in the same district, have the inflorescence and calyx varying from rather slightly viscid-pubescent to merely puberulent; the color of the flowers not recorded.

50. *P. CONFERTUS*, Dougl.; Lindl. Bot. Reg. t. 1260. Glaberrimus, semi-sesquipedalis, strictus; floribus dense glomeratis; cymis præter infimas fere sessilibus; sepalis lato-lanceolatis seu ovatis latissime albo-scariosis margine sæpius eroso-dentatis vel laciniatis aut acutis aut in acumen sæpe longum viride productis; corolla angusta 5–6 lin. longa, sulphurea. — Interior of Oregon and Rocky Mountains.

β. *CÆRULEO-PURPUREUS*. (*P. procerus*, Dougl., in Bot. Mag. t. 2954; Bot. Cat. t. 1616. *P. Tolmiei*, Hook. Fl. Bor.-Am. 2, p. 97. *P. micranthus*, Nutt. in Jour. Acad. Philad.) Spithamæus ad bipedalem; corolla cæruleo-purpurea. — Plains of the Saskatchewan, and through the Rocky Mountains to the coast range of Oregon and British Columbia. I find nothing beyond the color of the flowers to distinguish this from *P. confertus*; and the name *P. procerus* is singularly inappropriate for a plant like this, never tall, and ordinarily one of the lowest of the genus. The sepals are most variable, and the variations are not in relation with the color of the corolla.

++ ++ ++ ++ Filamento sterili glaberrimo.

a. Serratifolii, confertiflori, panicula stricta multiflora ; corolla parum bilabiata.

51. *P. DEUSTUS*, Dougl. in Bot. Reg. t. 1318. (*P. ilicifolius*, Nutt. ined.). Glaber ; foliis sæpe laciniato- seu pectinato-serratis, caulinis oblongis seu lanceolatis ; cymis pedunculatis, sepalis lanceolatis acuminatis ; corolla flavida semipollicari, tubo parum ampliato. — Interior of Oregon ; a rare species ; but it has been collected by Douglas, Nuttall, and (on the Spokane River) by the naturalists of Wilkes's Exploring Expedition. Also by Dr. Lyall, on the Kootenay River, in 1861. Corolla more slender than in Lindley's figure.

52. *P. HETERANDER*, Torr. & Gray in Pacif. R. R. Exped. 2, p. (9) 123, t. 8. Glaber (calyce minute puberulo excepto), virgatus ; foliis lanceolatis seu lineari-oblongis argute denticulatis ; panicula spiciformi interrupta gracili ; cymulis subsessilibus ; sepalis lanceolatis ; corolla albida semipollicari, tubo parum ampliato ; filamento sterili quandoque antherifero. — Sierra Nevada, interior of California.

b. Subintegrifolii, laxiflori, pedunculis 1 – 3-floris ; corolla bilabiata.

53. *P. WHIPPLEANUS* (sp. nov.). Pedalis ; caule debili foliisque membranaceis ovatis oblongisve subserrulatis glabris ; panicula parva ; pedunculis plerisque oppositis 1 – 3-floris ; sepalis lineari-lanceolatis longe attenuatis laxis cum inflorescentia viscoso-pilosis ; corolla pollicari superne valde ampliata bilabiata, labio superiore brevior suberecto bilobo, inferiore trilobo intus parce barbato ; filamento sterili glaberrimo apice dilatato uncinato. — Arroyas in the Sandia Mountains, New Mexico, east of the Rio Grande, Dr. J. M. Bigelow, in Whipple's Expedition, Oct. 1853. Stem slender, apparently diffuse from a decumbent base, leafy. Leaves thin ; the radical ones petioled, 3 inches long ; the cauline 2 – 1½ inches long, sessile, or the upper partly clasping by the rounded base, ovate-acuminate ; only the floral ones reduced in size, these with the peduncles and flowers more or less viscid-pubescent. Peduncles nearly as long as the floral leaves : pedicels short. Sepals 5 lines long, very attenuate, even narrower than those of *P. Jamesii* ; the corolla almost as ampliate as that of *P. cristatus*, but very distinctly bilabiate, its color not recorded. Except for the beardless filament and broader and thin leaves, this should stand with the above-named species.

+- Mexicani; panicula laxiflora; corollis roseis atro-purpureis violaceis, etc. superne ventricosampliat; foliis argute serratis vel denticulatis sensim acuminatis.

54. *P. CAMPANULATUS*, Willd. (cum synonym. Prodromi). Præter inflorescentiam pl. m. viscosam glaber; foliis caulinis distinctis lanceolatis ovato-lanceolatis seu linearibus argute serratis; panicula elongata nuda racemiformi secunda; corolla superne aut tubuloso- aut campanulato-ventricosa; filamentum sterili paullo barbato. — Common in cultivation, under various forms.

55. *P. PERFOLIATUS*, A. Brongn. Viscoso-villosus; foliis caulinis ovatis connato-amplexicaulibus denticulatis; panicula interrupta foliosa; filamentum sterili fere glabro.

Sect. 2. *SACCANTHERA*, Benth. Antheræ sagittatæ vel hippocrepiformes, loculis apice confluentibus rima unica deorsum usque ad medium dehiscentibus, basibus saccatis. Transmontani; inflorescentia paniculata. Corolla plerumque speciosa, violacea seu lilacina, superne ampliata, limbo breviter bilabiato.

* Undique viscoso-pubescens, grandiflorus; foliis amplis subserratis, superioribus cordato-amplexicaulibus.

56. *P. GLANDULOSUS*, Lindl. Bot. Reg. t. 1262; Bot. Mag. t. 3688. *P. staticifolius*, Lindl. Bot. Reg. t. 1770. — Oregon.

* * Puberulus vel glaber; foliis argute serratis vel pinnatifidis.

57. *P. VENUSTUS*, Dougl., Lindl. Bot. Reg. t. 1309. (*P. amœnus*, Kunze?) Glaberrimus, erectus; foliis lato- seu ovato-lanceolatis argute dentatis subcoriaceis; panicula thyrsoides laxiuscula; sepalis ovato-lanceolatis; corolla ultrapollinari e tubo angusto superne dilatata, lobis ciliatis; filamentis omnibus superne antherisque parce pilosis rariusve glabris. — Oregon.

58. *P. DIFFUSUS*, Dougl., Lindl. Bot. Reg. t. 1132; Bot. Mag. t. 3645. (*P. serrulatus*, Menzies in Hook. Fl. Bor.-Am.?) Puberulus; caulibus adscendentibus; foliis ovatis seu ovato-lanceolatis superioribus subcordato-amplexicaulibus crebre serratis; panicula sæpius foliosa, cymulis densifloris; sepalis ovatis acuminatis nunc laciniatis; corolla haud pollinari; antheris glabris; filamentum sterili apice barbato. — Oregon to British Columbia.

59. *P. RICHARDSONII*, Dougl., Lindl. Bot. Reg. t. 1121; Bot. Mag. t. 3391; Bot. Cab. t. 1641. (*P. laciniatum*, Nutt. in herb. Acad.

Philad.) Fere glaber ; caule sæpius ramoso ; ramis patentibus ; foliis ovato-lanceolatis seu angusto-lanceolatis incisus vel laciniato-pinnatifidis, ramealibus sæpe alternis ; panicula laxa ; corolla pollicari violacea ; filamentis sterilibus apice parce barbato. — Oregon. *P. argutus*, Paxt., of the gardens appears to be a form of this, or a hybrid between it and the foregoing species.

60. *P. TRIPHYLLUS*, Dougl., Lindl. Bot. Reg. t. 1245. Fere glaber, ramosus ; foliis lanceolatis seu linearibus paucidentatis pinnatifidisve rigidulis, inferioribus ternis vel quaternis, superioribus quandoque oppositis, ramealibus nunc alternis ; panicula laxa foliosa ; corolla semipollicari violacea superne parum ampliata ; filamentis sterilibus superne dense barbato. — Oregon to British Columbia.

* * * Glaberrimus vel pubero-glandulosus ; foliis integerrimis ; filamentis sterilibus apice complanatis glaberrimis vel glaberrimis ; pedunculis paucis gracilibus 3 – 6-floris.

+ Corolla semipollicari (cærulea) superne parum ampliata ; antheris glabris secus rimam minute denticulatis.

61. *P. GRACILENTUS*, Gray in Pacif. R. R. Exped. 6, (Bot.) p. 83. — Mountains of North California, Dr. Newberry. Lower leaves lanceolate, attenuate into slender petioles, the upper linear, attenuate at the base.

+ + Corolla ultrapollicari superne infundibuliformi-ampliata, limbo leviter bilabiata ; antheris secus rimam hirtello-ciliatis basi aut hirsutis aut glabris.

62. *P. HETEROPHYLLUS*, Lindl. Bot. Reg. t. 1809 ; Bot. Mag. t. 3853. Glaberrimus vel pruinoso-puberulus, vix glaucus ; foliis caulinis lineari-lanceolatis vel anguste linearibus basi attenuatis ; racemo virgato, nempe pedunculis unifloris raro bifloris ; corolla rubro-purpurea. — California. It is to be hoped that the color of the flowers may hold constant in this species ; for there are specimens which, in the shape of the leaves and in the inflorescence, in the herbarium appear quite ambiguous between this and the next species.

63. *P. AZUREUS*, Benth. Pl. Hartw. p. 327, no. 1819. (*P. glaucifolius*, Gray in Pacif. R. R. Exped. 6, l. c. *P. Jaffrayanus*, Hook. Bot. Mag. t. 5045, forma latifolia.) Glaberrimus, glaucus ; foliis caulinis anguste aut lato- vel ovato-lanceolatis, inferioribus nunc spathulato-oblongis, superioribus arcte sessilibus e basi lata subcordato-ovatis seu ovato-lanceolatis ; panicula virgata ; pedunculis 1 – 3-floris : corolla

pulcherrime azurea, tubo basi rubro-purpureo. — California. The above names all evidently belong to one species, variable as to the foliage, of which the *P. azureus* of Hartweg's collection represents the narrowest-leaved state, and *P. Jaffrayanus* of the Botanical Magazine the broadest.

64. *P. LÆTUS*, Gray in Jour. Bost. Nat. Hist. Soc. Subpedalis, pube brevi molli glandulosa cæcio-pruinosis; cæt. fere præcedentis. — Fort Tejon and vicinity, Xantus, Wallace. This is likely to be a glandular-downy variety of *P. azureus*.

Species incertæ seu vix cognitæ.

P. FRUTESCENS, Lamb. in Trans. Linn. Soc. 10, p. 259, t. 6. That this was collected in the Ural region (in the Government of Perm, by Georgi, 1773) — far away from its known congeners — seems to be made out by the ticket in Willdenow's herbarium, cited by Ledebour (Fl. Ross. 3, p. 222). So that Lambert was probably misled in some way as to the habitat "Kamtschatka and Unalaschka"; and my memoranda made in 1839 enable me to certify that there was no specimen in Lambert's herbarium to authenticate Pursh's habitat, "On the Northwest Coast, *M. Lewis*." Lambert's figure makes it clear enough that the species does not belong to the section *Erianthera*.

P. canosobarbatum, Kellogg in Proceed. Calif. Acad. Nat. Sci., Sept. 1859, (which is translated as meaning Gray-bearded Pentstemon,) I cannot make out.

P. rostriflorum, Kellogg, l. c., with cream-yellow flowers, is equally unknown to me.

Saccularia Veatchii, Kellogg, l. c., from Cerros Island, off California, of which two flowers were communicated to Dr. Torrey, one of them showing a small sterile filament, is probably a *Russelia*.

Addenda.

P. MENZIESII (p. 56), var.? *LYALLI*: ramis (an caulibus?) herbaceis virgatis sesquipedalibus; foliis lanceolatis tenuioribus elongatis (vix coriaceis 2–3½ poll. longis); cæt. *γ. Scouleri*. — Between Fort Colville and the Rocky Mountains, Dr. Lyall, ex herb. Hook. A most remarkable form, if not a distinct species.

Dr. Lyall also collected true *P. acuminatus*, Dougl., on the Walla-walla, with the dilated tip of the sterile filament bearded, as figured by Lindley, — and further north he obtained the rare *P. pruinosis*, Dougl.

4. *Revision of the North American Species of the Genus*
CALAMAGROSTIS, Sect. *DEYEUXIA*. By ASA GRAY.

The species of *Calamagrostis* which possess the rudiment of a second flower (*Deyeuxia*, Kunth.), that have as yet been detected in Eastern North America, I can discriminate as follows : —

* *Panicle loose and open even after flowering, and the (mostly purple-tinged or lead-colored) strigose scabrous glumes not closing in fruit : hairs of the base of the flower about as long as the hyaline lower palea or sometimes a little shorter, not surpassed by those of the rudiment ; awn slender, straight, about equalling the palea. Leaves flat ; culm tall.*

1. *C. CANADENSIS*, Beauv. Glumes ovate-lanceolate, acuminate, barely a line and a half long ; awn very delicate, not exceeding the hairs of the flower. — Subarctic America (from Bear Lake) and throughout Canada to Pennsylvania and New Mexico above Santa Fé (Fendler, 957).

2. *C. LANGSDORFFII*, Trin. Glumes lanceolate or oblong-lanceolate, attenuate-acuminate, $2\frac{1}{2}$ to 3 lines long, often cinereously strigose-scabrous ; awn stouter and often slightly exceeding the palea. — Labrador and Newfoundland to Behring Straits, Sitcha (*C. strigosa*, Bongard), and south to the White Mountains of New Hampshire in the alpine region (W. Boott), Santa Fé, New Mexico (Fendler, 969), and Oregon (Tolmie, Nuttall, *C. Columbiensis*, Nutt. in herb., &c.). Also Greenland (Wormskiold, fide spec. ex herb. Lehmann.) ; Scandinavia (*C. elata*, Blytt. *C. phragmitoides*, var. *elata*, Anderss., — and it has the aspect of the last-named species, but the rudiment is manifest) ; Russia ; and Siberia (*C. purpurea*, Trin., &c.). *C. hirtigluma*, Steud., is certainly this species, but not *Arundo Grælandica*, Schrank. *C. Langsdorffii* has been much confounded with *C. strigosa*, perhaps even by Wahlenberg himself ; whose *Arundo strigosa* would seem from the original figure and description to be the *C. strigosa* of Hartmann (*C. Hartmanniana*, Fries), while all recent Scandinavian authors take it to be another, closely related, strict-panicled species, and from Wormskiold's herbarium we have the open-panicled and long-haired *C. Langsdorffii* under this name. The latter may be what Wahlenberg communicated to Bongard. At least, spikelets received by me from herb. Hook., as "*C. strigosa*, Sitcha" (whether from Bongard is not stated), belong to *C. Langsdorffii*.

- * * *Panicle strict, its branches short and erect or appressed after flowering, and the glumes mostly closed: lower palea membranaceous or even of nearly as firm texture as the glumes, scabrous: awn stouter.*
- + *Hairs of the base of the flower copious, nearly equalling or only about one third (or rarely one half) shorter than the thin-membranaceous lower palea, not surpassed by those of the rudiment: awn straight or slightly bent, barely exceeding the palea. Leaves narrow and mostly inclined to be involute. Northern and Arctic species, also European.*

3. *C. STRIGOSA*, Wahl., under *Arundo*, according to Fries, Andersson, &c. Glumes lanceolate and gradually subulate-acuminate, considerably exceeding the flower, $2\frac{1}{2}$ to 3 lines long, scabrous on the keel; awn from or below the middle of the palea. — Referring to the remarks under the preceding species, I have only to add, that I have never seen an American or even a Greenland specimen of *C. strigosa*, as understood by Fries (Herb. Norm.) and all recent Scandinavian botanists, but have drawn the character from specimens of Fries and Blytt. The Canadian specimen mentioned by Grisebach in *Flora Rossica* probably belongs, like the Sitcha plant, to *C. Langsdorffii*, which, in the unexpanded state, might be confounded with it. The rudiment of the second flower, in all the specimens examined, is short and wholly or almost naked!

4. *C. LAPPONICA*, Trin. Glumes oval-ovate or lanceolate-ovate and short-acuminate or acute, about 2 lines long, little exceeding the flower; awn from slightly or much below the middle of the palea (hairs scarcely or nearly one half shorter than the flower). — Labrador and Greenland (*C. Grænlantica*, Kunth.), and Arctic sea-coast. Lower Canada, Pursh, Canad. Herb.!

5. *C. STRICTA*, Trin. Panicle larger and more lobulate, the spikelets more numerous, smaller (about a line and a half long), and more crowded than in the preceding; glumes lanceolate- or ovate-oblong, obtuse or acute; awn from the middle of the palea or lower. — Canada to the Arctic regions, the Rocky Mountains, &c. Spikelets mostly (but not always) larger than in the Scandinavian plant. Ledges at Willoughby Lake, N. Vermont, W. Boott: a rather luxuriant form, with spikelets nearly two lines long, resembling *C. chalybæa*, Fries, being to *C. stricta* what that is to *C. Lapponica*. Indeed, these two species appear to run together.

+ + *Hairs of the base of the flower slightly or one half shorter than the membranaceous lower palea and commonly surpassed by those of the rudiment: awn stout, divergent or bent when dry, but not twisted, not surpassing the glumes. Culms tall: leaves broad and flat. Eastern United States.*

6. *C. CONFINIS*, Nutt. Panicle elongated, its rather slender branches spreading in anthesis but soon appressed; glumes oblong-lanceolate and very acute, 2 lines long; hairs copious, slightly or one third shorter than the thin-membranaceous lower palea, which bears an awn much below its middle; grain glabrous.—In swamps, Pennsylvania and New York.

7. *C. NUTTALLIANA*, Steud. (*C. coarctata*, Torr., not of Kunth under *Deyeuxia*.) Panicle contracted and spike-like; glumes lanceolate and subulately long-acuminate, serrulate-scabrous on the keel, fully 3 lines long; hairs of the base of the flower scanty and barely half the length of the chartaceous-membranaceous and keeled lower palea on the dorsal side, longer on the other side, where they nearly equal those of the copious tuft at the summit of the otherwise naked rudiment; awn from half-way between the middle and the tapering summit of the palea; grain crowned with a bearded tuft.—Moist grounds, Massachusetts to North Carolina.

+ + + *Hairs of the base of the flower short and commonly not copious, not reaching to the middle of the lower palea, at least on the lower side of the flower: awn from towards the base of the firm-membranaceous palea, mostly bent or diverging above, spirally twisted when dry. Leaves usually flat.*

8. *C. PORTERI*, n. sp. Leaves broadly linear, a woolly-bearded ring at the junction with the sheath; panicle elongated, linear, with the branches appressed; glumes lanceolate, barely acute, pale, and rather scarious, 2 or $2\frac{1}{2}$ lines long; hairs of the flower and of the short rudiment scanty, nearly equal in length on the upper side of the flower and attaining about its middle, very short or wanting on the lower side; awn equalling the palea, suprabasilar, twisted.—Huntingdon County, Pennsylvania, at Pulpit Rocks, and between Alexandria and Huntingdon, in the mountain region, on wooded and dry hillsides, Aug. 1862, Prof. Thomas C. Porter. Stems 2 to 4 feet high. Leaves 2 to $3\frac{1}{2}$ lines wide, tapering gradually to a slender point. Panicle 5 to 6 inches long, not purplish. This is an American analogue of *C. varia* or *montana* of Europe; but in that the glumes are more acute, the beard of the rudiment far longer and more copious, and the awn longer.

9. *C. SYLVATICA*, DC. Panicle contracted; glumes ovate-lanceolate, sharply acuminate, about 3 lines long; hairs only one fourth of the length of the flower, but the plumose elongated rudiment with its hairs reaching to or much above the middle of the flower; awn suprabasilar, twisted, exceeding the palea and the glumes. — Arctic coast (*C. purpurascens*, R. Br.), Saskatchewan (a specimen in Bourgeau's collection has the second flower sometimes imperfectly, sometimes perfectly formed), &c., and Rocky Mountains.

10. *C. PICKERINGII*, Gray, Man. ed. 2. (*C. sylvatica*, var. *breviseta*, ed. 1.) Panicle pyramidal, contracted after flowering, purplish; glumes ovate-oblong, obtusish or obtusely somewhat pointed, 2 lines or less in length; hairs, both those at the base of the flower and of the short rudiment, scanty and very short, only one fourth or fifth the length of the very obtuse lower palea, which bears half-way between the middle and the base a stout and straight or bent (but not twisted) awn not surpassing the flower. — White Mountains of New Hampshire, in the alpine region, Aug. — Sept. A luxuriant and smaller-flowered variety of this was gathered far below the alpine region, at Echo Lake, Franconia, by Wm. Boott, Esq.; its spikelets only a line and a half long. Hairs wanting at the base of the back of the lower palea, as in allied species. Rudiment always less than half, and often only a quarter of the length of the flower, and sparingly plumose with short hairs, or merely tipped with a few such hairs, or not rarely perfectly naked!

From the western side of North America are some forms of *Calamagrostis*, as yet imperfectly known to me. The species in the books peculiar to that region are perhaps reducible to two, viz.: —

C. ALEUTICA, Bongard. Some spikelets from an authentic specimen, supplied from the Hookerian herbarium, show that I had correctly (in Proceed. Acad. Philad., July, 1862, p. 334) referred here the *C. pallida*, Nutt. in herb. Acad. Philad., a name changed by Mr. Buckley to *C. albicans*. The species is a well-marked one, with spikelets 3 lines or more in length, the equal palea of nearly the same texture as the glumes, short hairs at the base of the flower, and a short straight awn. From the character in the Reliquiæ Hænkeanæ I infer that *Deyeuxia Nukaënsis*, Presl., is the same thing.

C. DESCHAMPSIOIDES, Trin. Judging from the figure of Trinius and the description in the Flora Rossica, to this may perhaps belong one of Nuttall's species published by Mr. Buckley under the name of *C. rubescens*.

Mr. Agassiz made a communication intended to show : —

That the principle generally received by geologists, that difference of fossils indicates difference of age, and that identity of fossils is essential to synchronism of deposits, is erroneous ; for different areas of the same geological epoch would exist under different external conditions, and would therefore contain very different fossils, — just as the faunæ of the present day differ widely from each other in different parts of the earth ; also that the so-called tertiary age is made up of at least ten distinct ages, with faunæ specifically distinct from each other. If the principle thus far advocated has led to correct results, it is chiefly because the researches upon this subject have been carried on within one and the same zone in Europe and America. With the extension of our comparisons over wider areas of the earth's surface, it becomes evident that the faunæ of past ages, even when contemporary, may differ, according to their geographical relations, in a way similar to the differences existing among the faunæ of the present period.

Five hundred and fourteenth meeting.

November 12, 1862. — STATUTE MEETING.

The PRESIDENT in the chair.

The Recording Secretary read letters received since the previous meeting.

Cyrus M. Warren, of Boston, was elected a Fellow, in Class I., Section 3 ;

Alexander E. R. Agassiz, of Cambridge, in Class II., Section 3 ;

William P. G. Bartlett, of Cambridge, in Class I., Section 1 ;

George Searle, of Brookline, in Class I., Section 1.

Dr. C. T. Jackson presented a paper on the extraction of the cobalt oxide from the iron pyrites of Brockville, Canada West, by Thomas Macfarlane. He also enforced the great importance of a careful examination of the pyrites of this country for nickel, on account of the value of this metal at the present time as an element in the currency.

Dr. B. A. Gould presented some copies of his paper recently published by the Coast Survey, and entitled, “ *Standard Mean*